# The Builder.

VOL. XC.—No. 3291. MARCH 3, 1906.

## ILLUSTRATIONS.

The Queen Victoria Memorial, Liverpool ..... {Professor Simpson and Messrs. Willink & Thicknesse, Architects; Mr. C. J. Allen, Sculptor.

Design for a Skew Bridge (Grissell Medal, R.I.B.A.) ..... By Mr. Geo. Nott

1. Perspective View and Masonry Details.
2. Elevation, Plan, and Section.
3. Structural Diagrams and Notes.

*Illustration in Text.*

The Haarlem Gate, Amsterdam ..... Page 227

## CONTENTS.

| | PAGE |
|---|---|
| Report of the London Traffic Commission.—III. | 217 |
| Notes | 220 |
| Royal Academy Lectures | 222 |
| Luton Secondary Schools Competition | 224 |
| The Architectural Association | 224 |
| The Architectural Association Spring Visits | 228 |
| The Surveyors' Institution | 229 |
| The Appointment of District Surveyors | 232 |
| Illustrations:— | |
| The Queen Victoria Memorial, Liverpool | 232 |
| Design for a Skew Bridge | 232 |
| Sound-Proof Partitions | 233 |
| Efflorescence on Brickwork | 233 |
| Carpenters' Hall Lectures | 233 |
| The Builders' Foremen and Clerks of Works' Institution | 233 |
| The London Master Builders' Association | 234 |
| The London County Council | 234 |
| Applications under the 1894 Building Act | 235 |
| Architectural Societies | 236 |
| Archæological Societies | 236 |
| Engineering Societies | 237 |
| Books Received | 237 |
| Trade Catalogues | 237 |
| The Student's Column | 237 |
| Westminster City Council | 238 |
| Obituary | 238 |
| General Building News | 238 |
| Stained Glass and Decoration | 239 |
| Sanitary and Engineering News | 239 |
| Foreign | 240 |
| Miscellaneous | 240 |
| Legal:— | |
| West-End Ancient-Light Case | 241 |
| Action by Civil Engineer for Fees | 242 |
| Action by Decorative Artist against Builders | 242 |
| Patents | 242 |
| Some Recent Sales | 243 |
| Meetings | 243 |
| Prices Current | 244 |
| Tenders | 245 |
| List of Contracts, etc. | 246 |

### *Report of the London Traffic Commission.—III.*

TWO further volumes, which were published on Monday, complete the Report of the "Royal Commission on London Traffic," with the exception of Vol. IV. still to be issued, and to contain evidence and documents furnished to the Commission by engineers and public authorities in the United States and on the Continent. In large measure the new volumes—Nos. V. and VI.—serve the purpose of illustrating the publications which have been discussed in our previous articles.* But they go considerably beyond the scope of the material already made public, being particularly intended to present, in a convenient form, for the use of the proposed Traffic Board, the chief facts and suggestions placed before the Commission relative to London traffic.

The volumes consist almost entirely of plans, diagrams, drawings, and views to the number of more than one hundred, selected from several hundreds of the same kind, either prepared by the Commission or furnished by witnesses, other than American and Continental witnesses. Each volume is provided with an exhaustive index, which facilitates the reference of plates to the evidence printed in Volumes II. and III. of the Report, a feature which should be appreciated by all who may have occasion to study the subjects therein considered.

From this introduction it will be clear that while no new recommendations are contained in the volumes now made public, it would be a mistake to consider them simply as illustrations to the previously issued portions of the Report. Those who, like most of our readers, are accustomed to the interpretation of plans and diagrams, will find in Volumes V. and VI. a wonderful amount of valuable information, expressed in graphic manner, and far more easy of assimilation than if it were in letterpress.

Among the most important of the plans are those bearing upon the relation of passenger traffic to the form, area, amount, and density of population of various districts. Plate A illustrates the radial expansion of the metropolis, and includes the boundaries of the City, the Administrative County, the Metropolitan Boroughs, and parishes within a radius of 20 miles from Charing Cross. All railway and tramway routes, areas, and populations within the 20-mile radius are clearly indicated, and in the fact that the area in question includes a total population of more than seven million inhabitants, there is ample proof of the necessity for efficient and centralised supervision over all matters connected with the traffic problem. But the mere statement that some seven million persons are congregated in a circular area of 1,600 square miles is not sufficient to make clear the difficulties which have to be dealt with. The density of population in different localities is a far more potent factor, and this is represented very clearly in Plate VII., prepared from the census returns by Mr. Edgar Harper. Examination of the data here given shows that while the average density in the outskirts of Greater London is only about five persons per acre, the rate increases up to 200 persons per acre in districts such as Southwark, Finsbury, Shoreditch, Bethnal Green, and Stepney. It would not do, however, to stop here, for even in the central districts of London there are many open spaces, represented by public streets, squares, railways, canals, churchyards, and recreation grounds, and there are also other areas, small individually but large in the aggregate, which are more or less unpopulated. In Paris and some other cities accurate measurement is taken of all such areas so that the real density of urban population can be determined. To fill the gap in our own statistical records, Plate CVI. was prepared by Mr. Harper at the request of the Commission, showing in different colours the various classes of property and open spaces in Central London. The relevancy of this plan may be gathered by a comparison of the population density given by the census returns and those calculated upon the basis of "residential" and "commercial and residential" property as represented in the plan. Thus, while the census returns give the density of the population in the City, Finsbury, St. Pancras, and Holborn, at 40, 172, 87, and 147 persons per acre, respectively, the densities in the net areas of the same districts, as shown by Plate

* Nos. I. and II. appeared on July 22 and 29, 1905.

CVI., are respectively 1,140, 530, 523, and 484 persons per acre. These are night populations in each case, and if the day population of the City be taken on the net area the density is found to be no less than 848 persons per acre.

From the standpoint of hygiene it is satisfactory to find in the foregoing figures practical testimony to the collective magnitude of the more or less open spaces in thickly-populated parts of London. Considered in connexion with the housing problem the corrected densities are of some importance, but they do not seem to affect the question of traffic facilities very much, except perhaps in one or two districts where the open spaces are proportionately large. Of course, the dense population of the central districts gives rise to a large demand for means of locomotion other than walking, despite the fact that the bread-winners are in the minority, and the presumption that residence in such districts is dictated by the necessity of avoiding journeys to and from work.

Mere statistics of population, however, do not assist the traffic reformer very much unless considered in connexion with records such as those given in Plate VI., which shows the development of internal passenger traffic in Greater London from 1867 to 1902. In the former year, when the population was 3,605,510, the number of journeys was about 23 per head, and in the latter year, when the population was 6,702,063, the number of journeys had increased to nearly 140 per head. No doubt a large proportion of the increase is due to the growth of residential suburbs and the remainder to the temptations offered by improved means of local transport. This diagram indicates clearly that railways have not been responsible to a preponderating extent for the growth of travelling, inasmuch as local railway journeys in 1867 were at the rate of about 12 per head, and in 1902 not more than 41 per head. On the other hand, omnibus and tramway journeys have risen from 10 per head in 1867 to more than 93 per head in 1902. In fact, the omnibus services carry as many passengers as all the local railway lines, and the tramway services carry 50 per cent. more. When we remember that the railways, tramways, and omnibuses of London carry in one year a number of passengers equal to three-quarters the population of the entire world, it must be recognised that transportation on so huge a scale is not a matter that should be left entirely to private enterprise, and the absolute necessity for a central board of traffic is clearly brought home.

From the figures quoted above it is manifest that, up to 1902 at least, railway companies have failed to take their due share in providing means of transport for the growing needs of the metropolis. As we all know, their efforts have been chiefly directed towards opening up fresh districts in the outskirts to the dismay of old inhabitants and the general good of the community. We do not blame the promoters of railway lines for the lack of new routes within the more thickly-populated areas of London. That there has been a widespread desire to construct railways in the district is proved by Plates B, C, LXXVIIA., and LXXVIIB. The last two plans, prepared by Sir Henry Oakley, show all the railway proposals submitted to Parliament between 1855 and 1885, and between 1885 and 1903 respectively. Although these projected lines were not laid out in accordance with any scheme of co-ordination, some of them demonstrate in a remarkable manner the partiality of early promoters for routes still much in need of railway facilities, and the plans are most valuable because they give in ready form information much in request during Parliamentary inquiries, and of which no other public records are available.

The circumstance that railway routes have not developed at the same rate as omnibus and tramway services may be accounted for by three reasons:—(1) The difficulty of getting Parliament to do or sanction anything; (2) the persistent and sometimes combined opposition of existing railways to any prospective rival; and (3) the heavy cost of construction in a city where the price of land is almost prohibitive.

Tramway undertakings have also been handicapped, but not to the same extent, and the entrance of the London County Council into the ranks of tramway promoters has given a great impetus to the expansion of this class of traffic facilities. Omnibus proprietors, of course, are in an exceptionally favourable position. They require no Act of Parliament, no opposition can be raised to their projects, and the public streets provide a gratuitous and ready-made permanent way. So the omnibuses of London have flourished until they have become at once a great boon and a great nuisance, carrying annually a number of passengers equal to more than seven times the population of the United Kingdom.

The approaching completion of some valuable tube railways will do something to adjust the balance between railway and street traffic, but it does not seem likely that many new railway projects for central London will be sanctioned until Parliament has dealt in some way with the Report of the Traffic Commission.

In the meantime, there is ample scope in the outlying regions for the display of energy by existing railway companies. The great service rendered by suburban lines is shown by a series of four most instructive plans included in Plate LXXX., specially prepared for the Commission by Mr. R. W. Perks from old maps and other materials in the British Museum. These plans illustrate in four separate stages the railway route mileage, the population, and the area of land built upon in 1845, 1860, 1880, and 1900. They indicate in an unmistakable way the connexion between building development and the growth of railway facilities. From 29·75 miles in 1845 the route mileage rose to 248·5 miles in 1900—an increase of over 700 per cent. in fifty-five years. At first appearing like a small island in the middle of the present Administrative County of London, the built-up area in 1900 resembles a huge blot covering almost all the county, with large splashes outside something like an advertisement of writing-ink. To those familiar with the environs of London for a distance of 12 miles round the four plans constitute a very interesting study. Among other things they make clear the comparatively slow progress of building in semi-rural parts where railway services are notoriously bad, and the correspondingly rapid development in parts which are served by railway companies who have kept abreast with the times. They also serve to indicate districts where little or no building has taken place, thus suggesting to land owners and railway companies directions in which judicious enterprise might be undertaken for personal advantage with the ultimate effect of relieving congestion in the centre of the metropolis.

Plate F., prepared by the Commission, evidently as the result of laborious research, throws vivid light on the interconnected problems of housing and transport for the working classes. This plan, in three large sheets, shows the principal factories in and around the metropolis, together with the number of hands employed. It indicates in a striking manner the grouping of certain trades in different districts, and the attractive force of the Thames and other waterways, although this manifestation is by no means so marked as one would expect. The most remarkable feature of the plan is that the bulk of the factories are clustered between Westminster and Poplar in an area measuring about 4 miles from east to west, and some 3 miles from north to south. Beyond these limits, which include the heart of London, clusters give place to scattered groups and isolated dots.

The plan brings home anew the truth that, in spite of vast mercantile and residential districts, Central London is still a large manufacturing town. So long as factories remain in the inner region so long will thousands of working men continue to live near their work, whatever may be done in the way of providing cheap and rapid means of locomotion to tempt them away to more pleasant and more healthful neighbourhoods.

Workmen's trains and trams already convey enormous numbers of working men to and from the central and outlying factories. The number of passengers is on the increase, but not at such a rate as to reduce materially the density of population in such districts as Bethnal Green, Stepney, Southwark, and Bermondsey. Some day, perhaps, large factories will be eliminated from parts of the metropolis where land is most valuable. In the meantime manufacturers cling to the old sites, and, so far as one can judge by Plate F., the proximity of railway goods depôts possesses far greater attraction than the riverside and the low-priced open lands of Essex and Kent. This plan may be usefully examined in connexion with Plate E., showing the position of the various goods depôts in London.

The growth of mercantile London, the distribution of cheap electric power in the Home Counties, and extended railway facilities for goods traffic, may in time combine to push and pull many of the existing factories out of the central districts. But their place will be taken by other industries and businesses requiring manual and other labour, and we shall always be faced with the problem of conveying many thousands of men and women to and from a crowded city. The work of filling and emptying a great hive of industry every day is in itself a

sufficiently serious undertaking, and when we add to it the necessity of increasing means of transport so as to entice many thousands more to live at a distance from their work, the task becomes more serious still.

Very little consideration is needed to prove that radial roads are required to assist the daily migration between every point of the compass and the business centre. However inadequate they may be at the present time, the main highways and railroads of London run generally in the right directions for the conduct of the daily centripetal and centrifugal traffic, and it is a fortunate thing that the early morning immigration takes place before the local traffic of the centre has fully awakened. The evening exodus, again, is facilitated by the different hours at which work ceases in different classes of industry and business. Notwithstanding the preponderance of the great wave which floods and leaves bare the centre of London at the beginning and end of every day, there is a constant inward and outward flow of business people whose daily course of duty is not guided by the rising and setting of the sun, and of visitors to town bent on business or pleasure, and, in addition, there are constant streams of local and through traffic from north to south and east to west. Again, armies of commercial travellers, workmen, and others start out for various districts very soon after arriving at their first destinations, and those who remain in the business centres begin to move ceaselessly from point to point. All these movements taken together provide ample supplies of passengers for long streams of omnibuses and tramcars, which continue to monopolise the streets throughout the day. Hence, while radial roads and railways may provide admirably for traffic connected with the social aspects of the problem, they are less useful for local traffic in the central districts, and particularly for what may be termed cross-country communications.

Nothing is more easy than the formulation of a scheme on paper to improve the highways of the metropolis. Several witnesses examined by the Commission brought forward schemes for the construction of new highways on an extensive scale. Most of these proposals are centuries too late, for they could only be realised at fabulous cost under existing conditions. As heroic projects of the kind are practically out of the question, the most that can be expected is the gradual improvement of streets on the lines adopted in the past by the City Corporation, the Metropolitan Board of Works, and the London County Council. The advantages derived from the work accomplished by these bodies within the last half-century are too well-known to need recapitulation. Still, Plate IV., showing the chief street improvements effected at a cost of more than 16 millions in London during the past fifty years, is worthy of examination. Plate XC. indicates the admirable improvements carried out by the City Corporation since 1825, at a cost of 5 millions, and demonstrates in a striking manner how much can be accomplished by a definite and consistent policy, without serious disturbance of property.

Various plans and statistical diagrams relative to traffic are presented in the new volume of the Report. One of the most instructive is Plate VIII., showing the routes of all metropolitan omnibuses and the frequency of the services. The plan makes very clear the immense convenience offered by the omnibus companies, and at the same time the enormous amount of street area occupied by their vehicles. For instance, a passenger in Oxford-street has a choice of twenty-nine routes to different parts of London; in the Strand twenty-three, in Whitehall twenty-two, and in Piccadilly eighteen routes are open. Probably no other city in the world has more convenient facilities for local traffic than these. Unfortunately, the omnibuses take up far more room than can be spared. This is shown at a glance by the plan. At busy times 642 omnibuses pass the Bank an hour, through Oxford-street and Piccadilly the number is 400 an hour, and along other important thoroughfares 200 an hour is a fair average. The omnibus cannot be abolished, although it may be improved, and the problem of providing adequate space for this class of vehicle in addition to other traffic is one that presents serious difficulty.

From details contained in Plates XXXIII. A-I, it appears that the volume of vehicular traffic is fairly constant, or at any rate far more constant than that of foot passengers. The number of vehicles traversing any given thoroughfare does not by itself convey any definite meaning, and, to enable data for computations as to the density of traffic, Sir Alexander Bruce has prepared Plate XXV., giving the actual and relative widths of fifty-one important streets and roads in London. Only thirteen of these reach the width of 50 ft., seven of them being under 60 ft., and six over 60 ft. wide. To these must now be added Kingsway, with a width of 60 ft. The points where congestion is most painfully evident are already pretty well known to Londoners, but for the purpose of recording the facts, Plate XXIII., prepared by Mr. Riley, architect to the London County Council, indicates more than thirty points of maximum congestion. Four other plates set forth the pressing needs of Westminster, Stepney, Shoreditch, and Southwark in the direction of street area. The relief works suggested in the last five plans would fill a sufficiently long programme, and some of the more urgent might well be undertaken as a prelude to anything of ambitious character.

One point that cannot be overlooked is that at present the public are entitled to use the streets for trade as well as for locomotion. The unrestricted employment of busy thoroughfares for the loading and unloading of goods at all hours of the day is a practice that demands regulation without delay. Some photographs in Plates XLV.—XLVIII. show how various streets in the City are blocked all day long by vans. In certain streets fully 50 per cent. of the width is occupied in this way, and in others unhorsed vans of market produce are allowed to occupy half the roadway—a most economical method of securing a substitute for yard and warehouse accommodation. Other photographs published indicate the obstruction caused by the drivers of heavy vehicles by the erection of lamp and tramway columns along the middle of the road, by the establishment of tramway termini in crowded streets, and by the breaking up of road surfaces for attention to pipes and ducts. These are all matters which the Commission recommended should form the subject of immediate attention.

With regard to pipe subways London is undoubtedly much behind foreign cities, for, as indicated by Plates XVII. and XCV.—XCVIII., only fifteen streets in the whole of the metropolis have provision of the kind. The drawings in Plate XCVIII. of the Arthur-street East subway, built in 1887, represent an excellent design, and Plate C., prepared by Mr. H. E. Jones, embodies a useful method of connecting house service pipes with a minimum amount of public inconvenience.

Among the remaining plans contained in the volumes a few more relate to schemes and proposals advocated by witnesses as likely to reduce congestion of traffic in particular localities. The most useful idea of the kind is one submitted by Sir Henry Knight on behalf of the City Corporation for relieving the streets of much heavy traffic to and from metropolitan goods depôts and factories by the construction of a railway connecting all the goods depôts of existing railways. To some extent the purpose here mentioned may be fulfilled by the Outer Circle Railway, if the Bill now before Parliament should become law.

Consideration of the plans and diagrams relating to London highways and highway traffic leads inevitably to the conclusion that existing radial thoroughfares have almost reached the limits of their capacity in the older suburbs, and have quite done so in the busy centre. The substitution of motor-driven for horse-drawn omnibuses will give increased carrying capacity, and the continued extension of tramways will have a similar effect. Still, these developments cannot make the present main routes capable of rendering sufficient aid to schemes for housing the masses in the semi-rural outskirts. Nor will they do all that is wanted to facilitate transit across and in the central regions of London.

Therefore, the most pressing need is for measures calculated to add to the carrying capacity of existing main and auxiliary streets and roads, and to encourage the development of new neighbourhoods.

The chief proposals made to the Commission for tramway extension will be found in Plate XLIV., indicating the manner in which Mr. Stephen Sellon suggests that the tramways in the central area should be linked up to form a connected system. It will be remembered that some of Mr. Sellon's proposals were endorsed by the Advisory Board of Engineers and by the Commission, with the proviso that certain lines should be constructed beneath the surface. The Westminster Corporation also advocate shallow subways for tramway lines, and our readers will find in Plate XXXV. a series of valuable drawings representing a subway beneath the Strand with accommodation for two tramway tracks, to which access would be gained at almost every street corner through shops, so

as to obviate obstruction to pedestrian traffic. The subway also provides for the accommodation of pipes and ducts. Duplication of the Strand, Fleet-street, Ludgate-hill, and Cheapside in this way would be a great boon, and deserves consideration. The difficulties, however, would not be small, as demonstrated by Plates XXXIV. and XXXV., prepared by the Westminster Corporation, and Plates XCI.—XCV., prepared by the City Corporation, these plans showing the astonishing network of pipes, drains, sewers, and cables beneath the streets between Charing Cross and the Bank. To deal with these means much outlay, and the cost of the undertaking would be increased by compensation to property-owners whose vaults and cellars in some places absorb the greater part of the area below the streets.

Low-level tube railways already completed, under construction, and projected are shown in plans included in the new volumes. Although this method of transit is not universally popular, plenty of passengers will always be ready to avail themselves of it, and there is reason to believe that the tube boom will be revived as soon as Parliament has decided upon a definite course of action with regard to the Report of the Traffic Commission. The most interesting drawings in connexion with railways of the kind are to be found in Plate LXXIV., wherein Mr. Francis Fox takes various lines across London, and from the results of trial borings traces the depth of blue clay below the surface, the average on the selected lines apparently being about 30 ft.

That the creation of new tube railways is not likely to make a permanent reduction of omnibus traffic seems to be shown by diagrams relative to the Central London Railway, furnished by Sir Henry Oakley. Along the route of that line the omnibuses attract short distance passengers and the railways attract those who have longer distances to travel. New tubes will certainly be appreciated by people wishing to get across London more rapidly than at present. The effect will be to relieve surface vehicles of some passengers and to make room in the same vehicles for others who are now obliged to walk.

Many suggestions for new railways were put before the Commission, among these being a carefully-prepared scheme in Plate LXXXV. for a connected system of urban and suburban tube railways. This and other proposals should be of use for the guidance of railway promoters and the authority by whom new projects will have to be sanctioned.

As we have shown, the matter in VolumesV. and VI. of the Report illustrate almost every phase of the traffic problem, and by the concentrated manner in which the information is presented they serve to emphasise the necessity for the creation of a competent tribunal to whom all matters connected with metropolitan traffic should be referred, and upon whom ample powers should be conferred, so that projects calculated to benefit the people of the greatest centre of population in the world may be approved, if found good, without the disastrous delay, obstruction, and cost attending the process of obtaining Parliamentary sanction in existing circumstances.

## NOTES.

**The Institute Gold Medal.**

NO ONE has a greater admiration than we have for the architectural learning and power of delineation shown in the paintings of Sir L. Alma-Tadema, who, if he has not exactly taught us any facts about Greek and Roman architecture, has certainly added to our comprehension of its effects. We cannot but feel, however, that it was not the turn of a painter this year, and that the Council have shown rather a strange forgetfulness of the claims of one group of professional architects. The medal is stated in the Calendar to be conferred "on some distinguished architect or man of Science or Letters, who has designed or executed a building of high merit, or produced a work tending to promote or facilitate the knowledge of Architecture or the various branches of science connected therewith." It is of course under the latter definition that an eminent painter must come, and it may very well be argued that to have painted architecture well is as good as to have written about it well. But practising architects have the first claim, and it has been usual to give the medal to a practising architect for at least two years in succession, before breaking away again from the professional list. It was given to an English architect in 1902, to an American in 1903; to a distinguished writer on architecture (M. Choisy, who is not an architect) in 1904; to a distinguished English architect last year. It should now be the turn of a distinguished foreign architect; but we should have made no comment on the subject but for the singular ignorance or forgetfulness which the Council seem to be under in regard to the claims of French architects. It seems scarcely credible, and is certainly not creditable, that it is *twenty years* since the Gold Medal was offered to a French practising architect, in the person of Charles Garnier. Those who know what work is being done in modern French architecture may certainly be inclined to ask the Institute Council whether they know nothing of M. Nénot and the New Sorbonne, or of M. Girault and the Petit Palais—the latter perhaps the most original and most generally admired building of recent years in Europe. We quite approve of presenting the medal to a painter who has been an eminent illustrator of ancient architecture, at the proper time; but we say—architects first, and we consider that the claims to recognition of more than one eminent French architect have been most unduly overlooked.

**The Proposed Exhibition of Sculpture.**

WE sincerely hope that the endeavour of the Society of British Sculptors to get up a special sculpture exhibition will be successful, and that they will receive the support of the London County Council so far at all events as the grant of a site goes. The complaints of the unsatisfactory and crowded manner in which sculpture is shown at the Royal Academy exhibitions are certainly called for; and what Mr. Brock seems to have said to the representative of a daily paper, that "the word 'art' to the general public has come to mean simply the painting of a picture," is only too true. In fact, to the majority of visitors to the Academy the exhibition is really a popular picture show, the contents of which are looked at for the interest of their subjects and not for their artistic quality. In sculpture the subject generally is much more abstract and ideal than in painting, and therefore makes less impression as a subject or story; to make anything out of sculpture the mind must first have had some artistic training; whereas a picture, even to those who know nothing of art, often represents some incident which interests them for its own sake. Sculpture has none of these adventitious attractions (at least, when it has, it is bad sculpture); it is therefore the more necessary that it should be exhibited in a manner worthy of its importance as an art, and not made a mere appendage to a picture exhibition. The remarkable advance made by British sculpture during the last fifteen or twenty years is an additional reason for seeking an opportunity to make an adequate representation of the recent work of English sculptors. At present sculpture is the leading art in this country, though the public do not know it.

**Coast Erosion.**

GENERAL satisfaction must be felt at the announcement by Mr. Lloyd-George that the Government proposed to appoint a Royal Commission at an early date to inquire into the question of coast defence, and two or three kindred subjects, such as waste lands and afforestation. We are rather afraid that the inclusion of these other subjects in the reference will lead to delay, which is particularly to be deprecated in connexion with the problem of coast protection. If the only remedial measures were to be looked for in the form of an Act authorising Parliament to undertake an ambitious scheme for safeguarding all threatened lands at the cost of the nation, there would clearly be every reason for anticipating considerable delay. But it would neither be wise nor fair to relieve local landowners of responsibility, and a more judicious alternative is to be found in the granting of loans for longer periods than the term of twenty-five years at present forming the limit for repayment. The Government could do other things calculated to improve matters. In the first place they could determine at once that the removal of beach material should no longer be practised by various State Departments, and could exercise their powers more fully to prevent other people from offending in the same way. Then, it would not be difficult to arrange for the abandonment of Crown claims upon all lands reclaimed from the sea. That such claims should be enforced is particularly unfair, and nothing is more certain to take the heart out of private enterprise. If lands wrested from the sea became the property of those who have paid for them in money and work—as is the case in some Continental countries—there would be a healthy revival of interest in schemes for the reclamation of land. Recognising the sympathetic attitude of the new Government towards this great question, we hope they will take early action in the directions here indicated.

**Ecclesiastical Dilapidations.** THE Upper House of Convocation has decided to bring forward a Bill on the subject of ecclesiastical dilapidations. The two main points of the proposed measure will be to establish a survey of the premises at stated intervals, and the payment by incumbents of an annual sum on account of dilapidations to an appointed body. These facts embody what has more than once been insisted on in these columns, that the question of dilapidations should not be left to be decided to the time when the benefice becomes vacant. The surprising thing is that some practical measure has not long ago been passed, and it says little either for the energy or the business capacity of the dignitaries of the Established Church that the question of ecclesiastical dilapidations should have been allowed to remain in its present unsatisfactory state. It will, no doubt, be regarded by some incumbents as a hardship that the already small ecclesiastical incomes should be yearly diminished by an annual payment in respect of dilapidations. But we assume that, if at, say, the five-yearly survey it is found that no expenditure on a benefice is necessary, any sums paid in respect of dilapidations during this period will be repaid to the incumbent. The main points are that houses and buildings should not be allowed to get out of repair, and that there should be a sum in hand to pay for necessary repairs.

**Trade Unions' Returns.** THE Parliamentary Paper relating to Trade Unions just issued contains some interesting figures relating to the period up to 1904. At the end of 1904 the Trade Unions known to the Labour Department of the Board of Trade numbered 1,148, the total membership being 1,866,755. The year 1901 marked the highest recorded number of members, 1,940,874, so the decline to the end of 1904 is a falling off of 74,119 members, or 3·8 per cent. The Report states that periods of trade depression always cause a decline in the number of members, and it is significant that the Trade Unions of builders and general labourers for the above period lost members to the extent of 19·4 per cent. The membership of the Trade Unions shows a large increase when compared with years previous to 1899. The years 1902-04 brought a large increase of employees of public authorities, 23·6 per cent. gain, and of shop assistants, 60 per cent. Women represent about 6·7 per cent. of the total number of Trade Unionists. Interesting tables covering a period of ten years are given in connexion with the 100 principal Trade Unions, which represent 60 per cent. of the total membership, and their income shows a steady increase, as also does their expenditure, and the funds accumulated also steadily increase. For the year 1904 the figures are:—Income, 2,097,476*l.*; expenditure, 2,042,165*l.*; accumulated funds, 4,616,230*l.* In 1895 these accumulated funds amounted to 1,711,733*l.*, in 1904 they stood at the figures 4,616,230*l.*, having more than doubled in this period.

**Trespass on Walls.** THE case of Betts, Ltd., *v.* Pickford, Ltd., reported in our columns last week, is worthy of attention. The plaintiffs had taken certain land from the defendants on a building lease. The intention of the plaintiffs was well known to the defendants; they proposed erecting warehouses and a show-room on the land thus leased, and the plaintiffs had submitted plans to the defendants which disclosed the fact that there would be windows in the south wall. The defendants had had to clear the site for the plaintiffs, but a shed remained standing, which projected slightly over the plaintiffs' land, and in the course of the erection of the plaintiffs' premises the architect had permitted these projections to be built into the plaintiffs' wall. The projection, which was that of some roof timbers and certain iron stanchions, was very small, only some 4 in., but the local authority served a notice on the plaintiffs under the London Building Act, 1894, treating the south wall as a party wall and requiring them to brick up the windows. This summons stood over until the determination of the action in which the plaintiffs applied for an injunction against the defendants to restrain them from trespassing on their premises, and from using the wall as a party wall. The Court held that the defendants had derogated from their grant and were trespassers. It is to be observed that the defendants to some extent relied upon the action of the plaintiffs' architect in consenting to the projection standing and building it in, but the Court held this to be outside the scope of the architect's authority. The defendants were also, it was discovered, after the commencement of the action, using the east wall as a party wall for some stables, but there is nothing in the case to show that the decision would not have been the same in regard to the trespass on the south wall alone, and its result was certainly serious, as without windows the show-room would have been useless to the plaintiffs.

**Liabilities Attaching to Traction Engines** THE case of Dewar *v.* Tasker & Sons should be noted by those employing traction engines. The defendants were the owners of a traction engine, which they hired out for some months to another company. The defendants supplied a driver with the engine, whose wages they paid and they repaired the engine when necessary, and supplied the oil for it. The hirers had the right to give their orders to the driver, and directed where the engine was to go and what it should carry, etc. The plaintiff was suing the defendants for personal injuries he had sustained through the negligence of the driver. In these circumstances the Court held that the defendants were not liable, they had divested themselves of control over the driver, and the hirers were exercising the complete control.

**Sewage Disposal.** IN the recent case of Hobart *v.* Corporation of Southend-on-Sea, in which the plaintiff was suing the Corporation in respect of pollution to his oyster beds, and which occupied the Court some nine days, an interesting question as to the disposal of sewage was decided. The Corporation claimed a right to discharge the sewage into the river both by common law and by statute. The Court held that there was no common law right to create a nuisance to the plaintiff such as was found as a fact to exist in this case, and that the defendants were bound to keep their noxious matter from trespassing on their neighbour's land. As regards the statutory right, the defendants relied upon sect. 49 of the Public Health Act, 1848, but the Court held that this had been repealed by the Public Health Act, 1875, sect. 23 of which Act omits the provision relied upon as to draining into the sea, and the judgment laid down that the defendants, far from having any statutory rights, were expressly prohibited by the Sea Fisheries Acts and the by-laws made thereunder from creating such a nuisance in this locality. No prescriptive right on the part of the inhabitants as predecessors of the Corporation was set up in this case, and the Court granted an injunction and damages. The case must not, however, be read as prohibitive of the discharge into the sea of any sewage at all; its teaching is that if sewage be discharged into the sea, due precautions must be taken that its discharge shall not be the cause of nuisance to other's rights.

**The Design of Dry Docks.** IN an eminently practical paper read before the North-East Coast Institute of Engineers and Shipbuilders, Mr. J. Mitchell Moncrieff, M.Inst.C.E., discusses the main points for consideration by those who undertake the construction of dry docks for commercial purposes. Next to the general dimensions, the selection of a site, whenever selection is possible, is the most important matter. Instances of dock companies who have been saddled with excessively heavy capital expenditure owing to lack of care in this respect justify the author in the caution addressed with regard to the most searching preliminary investigation as to the real character of sites under consideration. He shows that the nature of the subsoil has very great influence on the design and cost of the proposed works, and to illustrate this point gives drawings of four docks built under his superintendence in the Newcastle district all exhibiting distinctive features and necessitating essentially different methods of construction. A part of the paper of significance to our readers is that relating to materials of construction, and particularly to concrete. The author says that the cheapness of concrete, its execution by unskilled labour, the facilities it affords for carrying on work in a loose manner, and the presumed monolithic result obtained by the mere deposition of one batch upon another, instead of being virtues are really vices so far as regards works exposed to salt water. We quite agree with the caution as to the necessity for adopting proportions that will absolutely prevent the admission of salt water to the interior of concrete so employed, for if percolation should be established nothing can prevent its ultimate disintegration. Mr. Moncrieff is equally correct in emphasising the importance of making all beds quite level and flat, and of making connexion between the successive beds by a layer of mortar. This is good advice, for neglect of the procedure recommended will result in percolation along the seams and consequent trouble of serious character.

**New Traffic Facilities for London.**

AS THE first installation in this country of a tramway on the shallow subway principle the line which was opened to the public on Saturday last is of distinct interest. Although the underground route only extends from Southampton-row to Aldwych, a direct service is now available from Islington to the Strand, and at some future date the line will serve as the first link between the northern and southern tramway systems. The usefulness of tramway cars able to dive beneath the surface in places where traffic is much congested has been amply demonstrated in Boston, and it may be wished that ere long London may be possessed of many similar lines. A means of intercommunication to which thousands of passengers are looking forward is the Waterloo and Baker-street tube railway, now finished from St. George's-circus to Baker-street, and only awaiting the Board of Trade inspection before being placed at the disposal of the public. It is gratifying to learn that every possible endeavour has been made to eliminate fire risks and to provide for the safety and comfort of passengers. When this line is extended to the Elephant and Castle at one end and to Paddington at the other it will indeed be a most valuable line for those who do not object to subterranean travel. Among its most meritorious features are the connexions provided with the City and South London railway at the Elephant and Castle, the South-Western, the South-Eastern and Chatham, and the City and Waterloo railways at Waterloo, the South-Eastern and Chatham, and the District railways at the Embankment, the proposed Great Northern, Piccadilly, and Brompton railway at Piccadilly, the Central London railway at Oxford-circus, the Great Central and Metropolitan railways at Baker-street, and the Great Western railway at Paddington. A few more schemes like the two mentioned above would do a great deal for the internal passenger traffic of London.

**The Reception at *The Tribune*.**

A SOMEWHAT unusual gathering was held on Saturday night last at the offices of the new daily paper, *The Tribune*, as the opening of a kind of club-room or rendezvous for members of the Liberal party and readers of and subscribers to the paper. We are of course of no politics in these pages; but the idea of bringing readers of a journal in closer touch with it by providing a meeting-room and reading and writing-room for them on the premises of the journal, is a new and happy one, and the thing was splendidly done; the only disappointment being the absence of the Lord Chancellor, who was to have been the chief orator, and who was kept away by public business. Bouverie-street was brilliant with electric lighting on the exterior of the offices; there was a large and distinguished company in response to the invitation of Mr. and Mrs. Thomasson, and some very clever speeches were made by Lord E. Fitzmaurice, the Lord Advocate of Scotland, and Mr. T. Gibson Bowles—speeches the humour of which could be enjoyed even by those who might differ from the opinions expressed. The meeting-rooms, and even the stairs to the printing-rooms (where the visitors were invited to inspect the printing of the report of the meeting), were lined with wire trellis entirely woven over with flowers—an American decorative idea, if we mistake not; and refreshments were on the most liberal scale in respect both of quantity and quality. The whole function was a great success.

## ROYAL ACADEMY LECTURES.

THE lectures to the students of the Royal Academy on sculpture commenced on Monday last week by a lecture from Mr. Colton on "Enthusiasm in Sculpture," which was to a considerable extent a repetition of the argument of a lecture delivered by him a year or two back. He wished to offer his advice, as one who was still a student, on some of the difficulties which looked like mountains ahead of them, but would be found to disappear more or less when fairly faced. Though he would not tell them to despise culture, with the examples of Reynolds and Leighton before them, he would say, be content to snatch general knowledge how they could, but let their thoughts be intent, day and night, on their actual work, and not be easily satisfied with it. Those who were satisfied were blind. He had known a gold medal gained stop a man's whole career. Failure should stimulate them; if a work they had spent six months over was a failure, spend two years over the next effort. They must be content to sacrifice comfort and even health in the strife to improve. English sculpture, it was generally admitted, had advanced immensely of late years; it must be their business to push that advance still further. It was said that there was no patronage for ideal sculpture in this country, but surely that was to some extent the fault of the sculptors; if more ideal work were produced, a demand for it would arise. One class of work for which there was now a good deal of demand—decorative sculpture with which jewellery was combined, was one form of ideal sculpture, and might lead up to something more important. But the time and labour which the art demanded was so great that only a great enthusiasm could carry them through it; without that quality a sculptor's life must be intolerable. The classical standards of sculpture were now outworn; their day was passed, and they had already been responsible for the production of many soul-less busts and statues. Realism and Idealism were but words, after all; let them observe the beauty of nature, get as near to that as possible, for in that path realism became also idealism. A little thought beautifully expressed was worth more than a great thought badly expressed. It was perhaps fortunate that there was no system of modelling at the Royal Academy, for, as they knew, one "Visitor" in sculpture was quite prepared to throw aside what the last had said, and thus they were under no temptation to make an idol of a system and to mistake the means for the end. The whole earth was filled with beauty to which unhappily many people seemed astonishingly blind; but it was their part to assimilate all they could of that beauty, and give some of it out again in their works. And in this connexion it might be said that clearness of vision was even more valuable than imagination. On the Royal Academy catalogue for 1902 there had been placed as a motto the words of Théophile Gautier—"Rien n'est usé pour le génie." To succeed in sculpture they must be prepared to make self-sacrifice; and they must take their art seriously. Anyone who made the mistake of approaching sculpture lightly would surely fail. The art was so absolute in its character that nothing sketchy could be admitted into it; and though they might have seen examples of sketchy work of a clever kind, they might feel assured that such work would not last long. A fine idea finely executed was what was required in sculpture. Let them look at the finished beauty of even fragments of Greek sculpture, and make that kind of work their test. He would especially say, be careful with the hands and feet of their figures; details which were often much neglected at present.

Bones were rather a bugbear of English sculpture at present. The study and knowledge of the skeleton structure was necessary, of course; but bones were not hard and rigid like rocks, or to be shown so, even where they came near the surface. The skeleton should be mastered and then—put on one side. Let them show what Nature showed, and not try to show more. Flesh was of equal importance with bone; it was what we actually saw in the figure; one might apply the well-known proverb, "Beauty is but skin-deep" quite truly in this sense; and flesh modelling must not be neglected, as he feared it was at present, for it alone represented life.

He would advise them to absorb all the criticism they could, and not be too sensitive if it was unfavourable. It would be better if frank criticism were more the fashion. In default of that let them go to nature. He was not attempting to give them anything of the history of the art; he left that to abler hands; and after all, if they wanted facts of history, they could find them all in the library. He was rather concerned with their practical attitude towards their art. A sculptor had to copy form as it actually existed, not, like a painter, to show its appearance only from one point of view. And they must bear in mind that truth to nature was concerned not only with form but with texture. Flesh was not of the smoothness of wax; and where a figure had to be made more than life size, the irregularities of surface forming texture had to be magnified in the same proportion. Sculpture was nothing if not vital; in copying life let them take care not to end in death. It had been said by a modern critic that sculpture had no limitations. They would hardly go far in the practice of the art without discovering that it had a good many; limitations in respect of size, shape, balance between subject and execution, etc. They could not model the Lord Mayor's Show; they could not model a landscape; and if the nature and suitability of subject had been considered they would not have seen such a subject as the representation of a public-house in a recent Paris Salon, with the innkeeper and a drunken customer at the door. The finest sculpture should represent a kind of dream, but a dream carried out with infinite patience in detail. Let them not be penny-wise and pound-foolish, in doing easily things of little merit, which might save labour now, but would bring them no ultimate return. Those who would be great in sculpture must labour hard.

At his second lecture on Thursday the 22nd Mr. Colton said that in advocating reference to nature he did not mean to imply that a sculptor might not be dissatisfied with his model and try to find a better one; but a sculptor was to express himself in the most emphatic manner, and the most emphatic manner was the direct reproduction of nature. No doubt what he had said in the last lecture, that sculpture should be "a fine idea finely expressed," was open to all kinds of questioning; one might begin by asking, "What is a fine idea?" but they must avoid entering into abstract questions of that kind on this occasion. But he would say that the general ideal of what constituted good sculpture had been the same for the Greek, the Roman, the Renaissance, and the greatest of the modern French sculptors. But recently there was a new idol set up of what might be called brutal execution. A giant rough-hewn out of a rock might be impressive on a great scale, no doubt; but was a reduction of that ideal to ordinary lifesize to take the place of the refined modelling which the highest sculpture demanded? This kind of thing was a part of the general hurry of modern life. Let an artist work to obtain technical skill, at the cost of labour and self-sacrifice, lest he awake and find that sculpture requires definite form which he is not in a position to supply. If he were able to set up what he would regard as an ideal art school for sculpture, he would make students begin with the living model; he would hide away all the antiques; then he would set them to making finished studies for some years, and then they might be let loose among the antiques, and would be in a position to understand them rightly. As it was, he could rather sympathise with the student who looked on the antique as a dull

convention. Yet we loved the stone idols of the past when we saw them, not in rows in museums, but under the light of a southern or a tropical sun. Transplant them to the East and its vegetation, and they found their souls again. Even in Hindu temples the simple masses of white marble in strong sunlight were beautiful; and the caves of Elephanta contained some of the most wonderful sculpture in the world, carved out of the solid rock. It was a great descent from this to the work of the modern native sculptor in India, who was in fact a craftsman rather than an artist. Yet they must not overlook craftsmanship; a sculptor must be sure of his craft if he wished adequately to express his ideas.

Sculpture had become more or less popular lately, but unfortunately it seemed only to become popular when it had lost the freshness of its first ideals. The wonderfully fine French sculpture of fifteen years ago had given place to eccentricities which were out of the true field of the art; for sculpture must never be theatrical. The praise which was shouted from the house-tops generally went to what was false in the art. There was a modern form of what might be called "arts and crafts" sculpture, which attracted by a gaudy show of sparkling materials and colour; it was not the best, but it might have done some good by popularising the art. But sculpture could express attributes of human character; not by exaggeration of special features or form, which was not originality—it was no more "original" to copy the eccentricities of the "rough-hewn" school than it was to copy the severity of Greek art—but by waiting and watching till they could find and seize the central expression which represented the real and essential character. And in trying to represent soul, let them not forget that the adequate representation of the body came before that. Let them attend carefully to the modelling of hands and feet, often too much neglected at present. They must be sure of their strength in dealing with outward form before attempting to represent great moral qualities; and let them beware of exaggeration; the healthy was the sane in art. Thin ascetic forms were not, as seemed to be supposed, spiritual; the skeleton was not life but death. There was an absurd craze now for exhibiting figures with legs and arms lopped off (perhaps under the idea that it left more scope for the imagination); busts were shown with no crown to the head, or one side of a face without the other. In one exhibition he could mention a large proportion of the works in sculpture were mutilated in one way or another; one did not know whether to take this as a sign of effort or as mere hypocrisy. Sculpture, again, should not represent the frivolous or absurd, and it should be as far as possible divorced from matter of fact. Sculpture, for instance, went very well with fountains, which were objects of a poetic association, and with gardens; and one was glad to find that the old cement and lead garden statues and garden ornaments were better appreciated now than formerly, and were being rescued from the gardens and bowling-alleys of country inns.

In regard to the intention or idea in sculpture, a man who was a mere craftsman would want ideas, but on the other hand the artist who had ideas could not adequately express them unless he had the skill of the craftsman; if he had not that he was lost. It was better to be in the position of a skilled worker than to be a dreamer without adequate power of expression.

On Monday afternoon Mr. Goscombe John lectured on "Modern Sculpture." After referring to the influence of Greek art, which continued long after the fall of Greece, which created Roman art and even largely influenced Renaissance sculpture, he referred to the work of Goujon and its highly decorative character, which resembled a good deal the style of the figures on Greek vases, yet with a character of its own. Germain Pilon was a sculptor with a wider range, and his work to some extent recalled Donatello. But the real father of modern sculpture was Bernini, who was a better artist than he was sometimes called, and who at all events infused into sculpture the element of vitality and the disregard of tradition. The Baroque architecture of the period was restless in effect—was always doing something, and the sculpture of Bernini was in the same spirit. Pierre Puget was contemporary with the later career of Bernini; he showed more restraint in design than Bernini, but with both of them the style of modelling suggested clay or terra-cotta rather than marble. During the XVIIIth and part of the XVIIIth century the whole of Europe was under the influence of Bernini. In Spain they had Alonzo Cano, a sculptor whose work was very emotional in character and showed often very excellent execution. In the XVIIIth century they had Canova and Houdon, two sculptors entirely opposed in principle. Houdon's work retained its value; Canova's was gone, inasmuch as he merely aimed at copying the antique, and acquiring a high finish which made his statues look almost like wax-work. Houdon had a great sense of style and an insight into character, and he never made a mannerism of imitating the antique. Puget, Coysevox, and Coustou might be said to have prepared the way for Houdon. They produced especially a remarkable series of portrait busts, which were as fine as the ancient Roman work of the same type. The revival of the Classic spirit at the end of the XVIIIth century led to nature being set aside, and the production of doubtful "antiques," in which many men of very moderate ability made a temporary success. The Elgin marbles produced little sensation at the time of their arrival; the Apollo Belvidere and the Venus de Medici were the standard at that time. The Elgin marbles were believed by some to be of the date of Hadrian; even Flaxman only said of them that they were "executed with great effect." Reynolds died twenty years before the appearance of the Elgin marbles; had he lived to see them, some passages in his lectures in regard to antique sculpture would undoubtedly have been altered. Canova, however, predicted that they would reverse our ideas as to Classical sculpture.

Roubiliac carried on in England the tradition of Bernini. He was a sculptor of independent genius and great power of expressing emotion, but lacked the feeling of quietude; even the shoes and the buttons on his clothed figures seemed uneasy; yet he was a man whose work it was refreshing to meet with in an age of artistic commonplace and mediocrity. During the Classic revival in England the two most prominent men were Bacon and Flaxman, the former of whom won the first gold medal given by the Academy for sculpture. It was singular that Flaxman apparently knew nothing of the works of Bacon, who was an able sculptor, interesting for his picturesque detail; his statue of Chatham in Westminster Abbey, and his Dr. Johnson in St. Paul's Cathedral, were especially worth mention; he was a sturdy lover of nature, and based his style on that and not on the imitation of antique statues. He invented the pointing machine now so widely used for transferring the model to marble. Banks, of about the same period, was a sculptor of no great charm, but he had a certain power, and it was curious to note that his figure of the fallen Titan was rather like an anticipation of the style of M. Rodin. Flaxman was one of our greatest artists, but his outline designs and small sketches in sculpture were better than his large figures, which were not always very well executed, and the influence of Canova was too perceptible in them. Thorwaldsen, who was a pupil of Canova, and Gibson, who was in turn a pupil of Thorwaldsen, both carried on the "antique" formula of Canova; their works represented the essence of academical art reduced to a formula. Gibson was supposed in his day to be an intellectual sculptor, but he forgot emotion, without which art was mere pedantry. The work of this period had, however, the merit of being simple and sculpturesque in character; there was no pretentiousness about it; but it was dull. In all good epochs of the art sculptors had been inspired by Nature; sculpture must be a living art and must represent its own age; the Greek sculptors worked for the Greece of their own day. The study of ancient work only meant the production of lifeless forms.

France had always been producing great sculptors; there was no break in her artistic history in this respect; and French sculpture was always vigorous with its own life and not depending on any outside influence. Her sculptors had written the nation's epic in marble and bronze. The art was never more nobly employed than during the last 150 years in Paris. The modern period was heralded by Rude, who died in 1855, and whose astonishing "Chant de Départ" which decorated the Arc de L'Etoile might be taken as the typical representation in sculpture of the revolutionary spirit. Rude furnished the link between the older and the modern French school, and his pupil Carpeaux was the first of a distinguished band among whom might be especially named Barye, Falguière, Dalou, and (among living artists) MM. Mercié, Frémiet, and Rodin. Barye brought into animal sculpture an entirely new life; before his day animal figures was mostly mere decoration of a very ordinary type; Barye created a school of animal sculpture, which in realistic vigour reminded one of the lion-hunting scenes of the Assyrian marbles. It was curious to note that the study of animal nature had so dominated his style that when he introduced human figures into his groups there was something animal in their character and expression. Falguière was essentially a modeller; his works had created an enthusiasm and had led up to the wonderful proficiency in modelling in the French sculpture of the present day. Dalou's works carried a suggestion of the open air, of inspiration from work-a-day nature; he was a product of the Republic, of the modern democratic France; he had however spent a good many years in England, and his "Triumph of the Republic" was actually designed at South Kensington. Barrias and Dubois represented sound tradition, perfectly scholarly work, but they had exercised very little influence. M. Frémiet and M. Mercié, the former a pupil of Rude, the latter of Falguière, had on the other hand exercised a very wide influence. M. Mercié's work, the "Gloria Victis" especially (of which an illustration was shown), was in the highest degree noble. M. Rodin's career was a fight and a protest; the polemical attitude taken up in regard to him was to be regretted, and did no good; he was an artist to be reckoned with in any case, and the future would judge his work dispassionately. For the students, let them go to nature, and they would not be in danger of being led away by eccentricity. He could not quit the subject of France without a reference to her great modern school of medallists, of whom M. Chaplain and M. Roty were the most conspicuous. Italy all this time was behind; her ancient glory had departed, and the chief merit of her modern sculptors lay in being very skilful carvers. There had been no German sculptor of wide reputation since Rauch, a sculptor of the Classic school, but with much picturesque force in his classicism; among the men of the present day Herr Begas was the most talented. Mr. John also referred with appreciation to the work of the Russian sculptor M. Troubetskoi, and to Mr. St. Gaudens as the first American sculptor of the day. The work of the late Constantin Meunier was mainly pictorial in its idea, though sculpturesque in treatment; there was no grace in his work, but it showed truth of character and sentiment. His modelling depended on structure, not on detail.

Since the days of Flaxman, England had Chantrey's admirable work; and he would also mention the statue of Wilberforce by Joseph, which was a very fine portrait statue, and in force of character might compare with Houdon's celebrated "Voltaire." Macdowell's "Nymph" in the Diploma Gallery was a beautiful work. Foley was a sculptor who was educated under the old order of things; yet his work, especially his equestrian statue of Sir James Outram, pointed to the coming change. Stevens was a splendid anachronism, whose work resembled nothing else in English and of his period; he was a Renaissance artist born into modern England. English sculpture had been very much alive during the last twenty-five years; Carpeaux and Dalou had exercised a great influence upon it, and Leighton perhaps most of all, who had assisted this art by every means in his power. After some cordial words of appreciation of Harry Bates and Onslow Ford, whose death had been such a loss to

English art, the lecture was concluded by the exhibition of an illustration of M. Mercié's splendid group representing "The Genius of Art," the last of a set of most interesting illustrations which accompanied the lecture.

## LUTON SECONDARY SCHOOLS COMPETITION.

FOR this competition, conducted by the Bedfordshire Education Committee, ten architects were selected to compete, and Mr. H. Percy Adams was appointed assessor. We do not know, and from results it is difficult to judge, upon what grounds the ten were chosen in the first instance. At any rate the standard, with one notable exception, falls very far short of what we had looked for in a limited competition of this nature. More than half the competitors have utterly failed to justify their selection. Neither the assessor's report nor the report submitted by Messrs. Spalding & Spalding with their winning designs were on view at the Shire Hall, Luton, on Monday. All the other reports were, however, displayed. We do not like to suggest that these reports were designedly suppressed by the authorities at Bedford. Indeed, telephonic communication brought the assurance that the reports would be sent through in the afternoon. They did not arrive. We cannot, therefore, review the designs and the award on the same footing. But we cannot understand the award, and we cannot agree with it. The winning scheme may be the *cheapest* submitted, but a high price is paid for this cheapness. The plan violates not a few of the cardinal axioms in school planning, and it will be interesting, indeed, to learn how it fares at the hands of the education authorities in Whitehall. In the conditions certain requirements were set forth to the end that a Secondary School and Technical Institute for 300 children (150 boys and 150 girls) might be obtained at a cost of 6,000*l.* Competitors were, however, "at liberty to submit their own estimates of the cost, provided that they show clearly how much of the whole scheme can be carried out for 6,000*l.*, and yet be complete in itself and meet the requirements of the Board of Education." The site is irregular, with a frontage to Park-square of 108 ft. between adjoining buildings. There is a depth of about 350 ft., and on the left flank, some 180 ft. from the frontage line, there is a further space about 100 ft. by 70 ft., with a narrow frontage out to Church-street. To keep well up to the Park-square front, thus leaving a maximum area for playgrounds in rear, was apparently the problem. In Messrs. Spalding's design this is done, even to following the irregular existing frontage line; while in Messrs. Russell & Cooper's scheme the frontage is squared up by setting back a few feet, with much gain in dignity of elevation. We hold no brief for Messrs. Russell & Cooper, but their scheme stands out so far superior to all the others submitted that we are altogether at a loss to understand the assessor's award. It is a model of compact, convenient, and resourceful planning and design, adapted to the site in every way most cleverly, and it is withal treated with architectural fitness and dignity of expression. We can only suppose that the question of cost has weighed with the assessor to the exclusion of almost every other consideration. In Messrs Spalding's design the six classrooms on the ground floor open directly out of the assembly-hall (64 ft. by 37 ft. 6 in.), three on either side. There is a very narrow gallery to the two sides and across the ends of the hall, with classrooms similarly disposed—three for twenty-five to the playground side, one for twenty-five and two for thirty to the fronts, and on the second floor there are three rooms corresponding to these latter, allocated to chemistry, physics, and cookery, except that a passage, 4 ft. wide and about 100 ft. long, badly lighted and planned as to stairs, is taken off the back of them. Two art-rooms, separated by the length of this passage, occur at the top of either staircase over the masters' common room and office respectively on the first floor, below which, again, on the ground floor, are the headmaster's room and the mistresses' common room. These latter are lighted into small and objectionable areas, and both have water-closets opening directly out of them, regardless of the fact that the "Head's" room would be used for interviews with parents and others. A passage against either flank wall of the site gives, past the changing and cloak rooms, access through to the playgrounds in rear, the boys on the left, the girls on the right. The cloak-room divisions form *stalls* 4 ft. wide, which would be the scene of much confusion and congestion. The entrances from the street are narrow, and have bicycle-rooms next them, into and out of which it would be almost impossible to negotiate a machine. The planning of the stairs is very bad, and their start from the ground floor could scarcely be worse. They are next the street, instead of next the playgrounds, and above they open out as "wells" some 14 ft. square. The assembly-hall has an open queen-post roof, and the lighting would be quite inadequate. The workshops are placed against the Church-street frontage, thus blocking any access there, besides being at some considerable distance from the school building.

In Messrs. Russell & Cooper's design few, if any, of the defects above noted are evident. The general disposition of the hall and classrooms is much the same, but there is a central entrance giving access to the headmaster's room, and office adjacent. The latrines and workshops are admirably planned into the irregular boundaries of site, and the playgrounds are made the most of. The arrangement of the second floor is incomparably superior to the winning one, and we should have thought that, even after getting both these schemes down to the same basis of cost, there would have been no question whatever as to the superior merits of Messrs. Russell & Cooper's scheme. Space does not admit our commenting further on the various designs, but it was observed that one competitor who had gone to the trouble of sending in two schemes—fifteen sheets in all—had apparently torn his name and address off them for some reason best known to himself, and which we will not endeavour to fathom.

## THE ARCHITECTURAL ASSOCIATION:

### SPECIAL GENERAL MEETING.

A SPECIAL general meeting of the Architectural Association was held on Friday last week at No. 18, Tufton-street, S.W., Mr. E. Guy Dawber, President, in the chair, to consider the council's proposal to add the words "editor of the A.A. *Journal*" after the word "librarian" in by-laws 21 and 30, and substituting nine ordinary members in by-law 21 in place of ten.

The Chairman said that this slight amendment was proposed by the council as it felt that the post of editor of the A.A. *Journal* should be balloted for annually, as in the case of other officers, and, as it was not desirable to increase the number of ordinary members of the council, it was proposed that the editor should be an ex-officio member of the council. This will still bring the total of the council to seventeen members, as before. The council also feel that it is eminently desirable that the editor should always be a member of the council, in order to be *au fait* with the work and policy of the Association.

The Chairman accordingly moved to that effect, and the motion was agreed to *nem. con.*

The ordinary general meeting was then held, the minutes and nominations being read.

The following gentlemen were elected as members:—*i.e.*, Messrs. A. D. Leroy, J. A. Mettham, D. Kibbler, E. S. Coldwell, H. C. Chatfeild Clarke, J. E. Lee, F. G. Geary, C. W. Ferrier, and G. E. G. Leith.

*New Premises Fund.*

Mr. C. L. Fleming-Williams having been reinstated, the following further donations to the Building Fund were announced:—Messrs. E. B. l'Anson (second donation), 10*l.* 10s.; Ernest Newton (second donation), 3*l.* 3s.; P. H. Adams, 1*l.* 1s.; H. J. Rippon, 10s. 6d.

*Porches and Approaches.*

Mr. F. T. Baggallay then read the following paper on "Porches and Approaches":—

"In making the customary apology for the imperfections of this paper, I may say (and you will readily believe it) that my chief embarrassment has been the enormous number and variety of examples that might be quoted, and the consequent impossibility of covering the ground at all adequately. I have failed to find satisfactory drawings or photographs of a few examples it would have been interesting to illustrate; but, again, the chief difficulty was to reduce the list to one that would not weary you. I am greatly indebted to Mr. Alan Potter, hon. secretary of the Architectural Association Lantern Slide Committee, for help in selecting slides, for getting some made, and, in two or three cases, for the original photographs.

*Introduction.*

In this room no apology can be needed for calling attention to the fact that, in many cases, nearly as many opportunities for architectural treatment are to be found in the surroundings, the accessories, and especially the approaches, of a building as in the building itself. It is true that in the middle of crowded towns land is too scarce and dear for devotion to such amenities; unless the building be a public one or a palace. But in the open country and the villages, and even in small towns and suburbs, the meanest cottage or villa has at least, or ought to have, its proper forecourt. And many a commonplace building, great and small, has been redeemed from insignificance, many a beautiful one has been raised to the first rank, merely by the treatment of the approaches, or even by the addition of a well-designed porch to attract the eye and concentrate the attention of the passer-by.

In this country, at any rate from the time of the Druids until the last few years, there has never been any attempt to form those grandiose and impressive approaches which most other nations, ancient and modern, have deemed appropriate in the case of especially important or sacred edifices. And we have no porches which will compare, for instance, with those of some of the French cathedrals on which the masons lavished so great a wealth of art and religious fervour. Our mediæval forefathers spent, however, art and money on porches and gateways with enough liberality to show that they regarded such features as of more than ordinary importance. And from the Tudor period down to the beginning of the last century, the art of contriving decent and dignified approaches to private houses was well understood both in England and Scotland, and almost universally cultivated. If people did not rise, and could not often be expected to rise, to the magnificence of Bacon's three princely courts, with their walls and turrets, terraces, and colonnades, architects (as is proved by existing plans), and the owners of a few great houses, strove to get within measurable distance of that ideal. And even the smaller houses, whether in town or country, were generally approached through at least some sort of enclosed forecourt of a formal and architectural character, with an outer gate on which a decent amount of art and money were spent.

The ideas and circumstances of the XIXth century led, however, to a deplorable change. Formal approaches almost disappeared with formal gardens in a vain and childish attempt to imitate the beauties of natural landscape. The stately gateway, the straight avenue, and the spacious forecourt gave way to a sort of glorified field-gate and a serpentine-road which seems to turn aside every few yards to avoid a laurel or a nettle, reveals, by carefully-arranged accidents, occasional glimpses of the surrounding scenery, and at last lands one, sideways and unexpectedly, at the door of a mansion, which, if the art were entirely successful, would seem to be situated in the midst of a wilderness. The hard utilitarian spirit of land and building speculation has dealt even more hardly with the forecourts of small suburban and roadside houses, which, except for a cheap gate and a bit of cast-iron railing, are left to be dealt with by tenants who have but a few years' interest at most in the property.

But as the love of beauty and appreciation of art grow and spread in the nation (as we all hope they are doing) we, as architects, are beginning to be called upon again to consider and to contrive those decent accessories and approaches without which a building, with even the smallest architectural pretension, is but a kernel without a shell, and, one with the greatest, a jewel without a

setting. From the point of view of this paper it is especially worthy of note that the most striking sign of the better spirit has been the scheming of a grand processional approach road to London's Royal palace. It is true that an untimely, and considering the occasion unlooked for, parsimony on the part of the public has shorn the work, for the present at any rate, of most of its architectural adornments. But the mere fact of its inception and execution is an encouragement to consider the question of architectural approaches generally.

*Egypt.*

Without attempting a strictly historical treatment of the subject, I may reasonably first call attention to the approaches to the great Egyptian temples as among the most notable examples of the grand manner.

In their case the spacious open courts which have a prominent place in almost every great architectural scheme, ancient or modern, were in the strictest sense forecourts, and are supposed to have been a development of the walled spaces or outer defences in front of the mouths of caves, which were naturally used by the original inhabitants of the Upper Nile valley for dwellings, tombs, and temples.

When the great temples of Thebes were built the original purpose of the forecourts may have been forgotten, but their varied usefulness as well as tradition secured their survival. They secured privacy for the temple proper, and space for ceremonies and processions, attended probably by large crowds of worshippers; and the porticos which flanked their walls internally were, in that climate, no doubt, a sufficient dwelling for the many servants and hangers-on of the establishment. In any case, a second, or even a third, forecourt was in several cases added by the pride or care of successive generations.

But the most striking feature of the approach to an Egyptian temple, a unique one in the history of architecture, was the pair of great towers which flanked and dwarfed the outer gate, and formed the front wall of the forecourt. We call them "Pylons," after Herodotus, and the proper Egyptian term seems to have been "Sebkhet," which had much the same meaning—merely "door."

They were rather exaggerated walls than towers. Of little depth but so high that they always overtopped the temple proper, sometimes by 100 per cent., and so wide that they usually well overlapped the side walls of the court. Their faces were smooth and slightly battered, and the main purpose of their peculiar form was evidently to provide a spacious and suitable field for the illuminated texts of the sacred scribes. Almost as certainly, I think, they represent the face of the cliff surrounding the narrow entrance to the original cave temple, which must have been used for the same purpose.

In front of the pylons were obelisks and colossal statues, usually seated. And, in some cases, it is said, the gate was approached through an avenue of sphinxes.

At the opposite or inner end of the nearly-square forecourt, between the court and sanctuary in the original arrangement, was either a deep open portico or an enclosed hall of close set columns, the most important feature, architecturally, of the whole group. In most cases, when a second court was added the arrangement of pylon, court, and hall (or portico) was repeated, and the famous hypostyle hall at Karnac was the hall of such an addition; behind it is the pylon of the original court. The whole of the approaches, therefore, to the Egyptian temple, when fully developed, were an avenue of sphinxes, a pair of pylons, a forecourt, a hypostyle hall, perhaps a second pair of pylons, a second court, and a deep portico or second hall of columns.

*Chaldea and Assyria.*

In Chaldea the temples were mere shrines elevated on steep terraced mounds, and approached by flights of steps or winding inclines. But, according to more recent discoveries, these mounds were approached like the Egyptian sanctuaries, through one or two forecourts with more or less striking gateways. Several such gates are represented in the bas-reliefs in the British Museum, and usually consist of a square-headed opening flanked by square crenellated towers as if for defence. In Assyria the Royal palaces were the principal buildings; but of the approaches to them we only know that, since they stood on mounds, they must have been reached by flights of steps, with inclines, probably, for the chariots. The main gateways seem to have had semicircular arches faced with glazed tile or faïence, judging from the city gate discovered by M. Place. The responds of the arch were huge sculptured bulls with human heads, some of which have been removed to modern museums. There are two very fine ones in the British Museum.

These gates were sometimes pierced through towers, and sometimes flanked by smaller ones. The sumptuous style of the staircases leading up to them may probably be fairly estimated from the ruins of those to the Palace of Xerxes at Persepolis, a building of much later date, but the general style of which was largely based on the Assyrian palaces. Perhaps I may be excused for showing at this point a view of a Japanese temple which I found in a French journal, and which seems to me to exhibit the effectiveness of stairs and terrace approaches even when combined with grotesque architecture and an incomplete symmetry.

*Greece.*

Returning to the prehistoric styles further west, the approaches of the Mycenæan palaces differed again entirely from all those hitherto noticed. They were more like the approaches to a Norman castle. Indeed, the resemblance is striking if you forget the drawbridge and overlook questions of style. There may be nine-and-sixty ways of constructing tribal lays, but perhaps there is only one of constructing the approach to a tribal chief's fortress. The palace was built on a hill-top, and was only to be reached by a narrow road ascending the flank of the hill and exposing the right or unprotected side of assailants to the kind attentions of the defenders on the walls. There were several narrow gates to be passed, and they were carefully situated in internal angles of the wall exposed to a cross-fire of stones and darts. Utilitarianism of the sternest kind was alone considered until the main gate leading to the forecourt of the palace was reached. This, judging by remains, was more sumptuously treated, with internal and external porticos supported on columns (probably wooden columns).

These porticos may have served both as shelter for the guards on duty and as the court of justice of the king or chief, in accordance with the practice of semi-barbarous chieftains in the East in all ages. Greece is not, perhaps, strictly Oriental. But the Huns, at a later date, brought the practice with them much further west, and all we know of the Mycenæan civilisation, including the plans and decorations of the palaces, suggest an Eastern origin.

The gateway on the Acropolis at Athens, the admiration of the ancient world, and called by them emphatically "the Propylæa" (it is said the term was never used until modern times for any other gate) was undoubtedly merely a rebuilding, on a glorified and extended scale, of the gateway to the old palace of the kings of the Mycenæan period. The approach to the gates (the plural form of Propylæa is said to have reference to the two gates, or two leaves of the gate, and not to the porticos) curiously enough, as it seems to us, remained the old narrow steep pathway winding round the bastion from the south. Whether, if war had not intervened to stop the work, the road would have been improved too, it is impossible to say; but somehow it was hardly the kind of feat that one suspects would have appealed to the Athenians even if it had been safe. The genius of Greek art, however refined, seems to have been narrow. There is no clear evidence that it ever extended from the consideration of a single structure to a group. A little superstition or priestly jealousy was allowed, even at Athens, to cripple or to crowd the finest works; and each had to stand alone, neither leading up to anything else, or itself the crown of a comprehensive scheme. It is true that in many, perhaps in most, cases there was a wall and portico enclosing the court or "temenos" in which the temple, or several temples with subordinate buildings, stood. But, in all cases with which we are fully acquainted, the form of the court, the position of the gate, and the situation and orientation of the various buildings seem to have been entirely fortuitous, or decided in each case separately, without reference to the rest.

In considering Greek approaches, unless we accept partial and inconclusive evidence, we can only admire the fine judgment and unwearied industry of the artists in refining the proportions and the details of porticos such as those of the Parthenon and Theseum; wondering whether it was really worth while; feeling that at any rate such an effort is beyond us in the present day, and might even be rather absurd.

*Rome.*

Of the ambitious spirit of the Imperial Roman architects in designing and carrying out the most splendid schemes of approach, there is, on the other hand, ample evidence in history and in the ruins of some of them. Marble porticos, surrounding and leading up to spacious courts: and decorative arches, triumphal, memorial, or merely emphatic of an entrance or a particular point, were the chief materials with which they produced their effects. But they did not disdain on occasion a fine flight of steps; and, as their native temples were mostly raised on a high podium, that feature was common.

The completeness with which Roman work has, in almost all cases, been destroyed unfortunately leaves little for illustration except a few ruined arches, rows of columns, and some plans.

Triumphal arches were more often than not erected as entrance-gates; in many cases in the provinces as the main entrance to the city. Among the well-known examples, the arch at Rimini was the south-east gate of the town, on the Flaminian way. That at Beneventum was the eastern gate on the Appian way. That at Orange, in France, was the northern gate of the town. Those at the naval station of Pola, in Istria, at Treves, on the Moselle, at Autun, and at Verona, were all city gates. The late "Arch of Hadrian," at Athens, was the gate of one of the quarters or suburbs of the town which he rebuilt. The fine arch of Trajan, at Ancona—so much finer in its erect simplicity than most of the over-enriched work of that emperor—was the entrance to the quays which he built. The arches at St. Chamas were the entrances to a bridge: and so on.

In Asia and North Africa most, if not all, the Roman city gates were of a similar, though plain, architectural character.

In Asia the city gate was often but the end feature of a street lined on both sides with either marble colonnades or covered porticos, leading right through the town or up to its main feature. In Palmyra such a street seems to have existed before the great temple of the Sun, or before the latter became the great feature and main glory of the city. And, as the street did not run directly towards the temple, there was a bend to disguise when it was desired to make the one lead up to the other. This difficulty was overcome by the arch seen in the view, which is built on the wedge-shaped plan familiar in doors on a small scale to all practical planners, but never, I fancy, seen elsewhere on such a scale. Such streets are said to have existed from very early days—170 B.C., at any rate—in Asia: but we do not hear of them on any great scale in Europe, except in the case of Constantinople, where one led from the forum to the palace.

The triumphal and memorial arches erected in Rome itself seem to have been generally isolated monuments; but the arch of Trajan was the entrance to his forum, and the forum was the forecourt to the Ulpian basilica. The arch had a single opening, but was decorated with sculpture in the rich and heavy style which, it is suggested, was due to Trajan's Spanish taste. Some of the carving is now to be seen on the arch of Constantine.

The forum was nearly a square of 400 ft., and on two sides had a double portico and an immense semicircular recess or hemicycle. The basilica occupied the whole of a third side, and was what we should call "double-aisled," with a large apse to accommodate a magistrate's tribunal at each end. On the

further side of the basilica (from the forum) was the great column, which could be viewed from the galleries surrounding the small court in which it stood; and beyond that again the temple of Trajan.

The whole group of the arch, forum, and basilica, and the small court may reasonably be looked on, from the architectural standpoint, as the approaches to the temple of Trajan, the crowning feature of the most magnificent of Roman works; or the one, at least, which most forcibly struck the imagination of those who, in later times, saw it when partly ruined.

Another finely-conceived approach was created in Rome by that great building emperor, Trajan's successor, Hadrian. It lead to his mausoleum, now called the Castle of St. Angelo, and took the form of a bridge over the Tiber leading from the stone quay on the city side right up to the gate of the mausoleum (the quay on the mausoleum side now buries several arches of the bridge). There were, of course, as in the case of other ancient bridges, arched gateways at the ends, which, like the decorative parts of the mausoleum have disappeared; and if it were not for Bernini's angels the whole affair would now be very tame and uninteresting. The temptation to dwell on Roman approaches of the Classic period is great. They were so well conceived; but they are difficult to illustrate, and I will only mention one other example, that at Baalbec. I do so on account of its many curious and interesting peculiarities.

A flight of over fifty steps, 150 ft. wide, leads up to a front close on 240 ft. long, and consisting of an open portico of the Corinthian order, stopped at the ends by what are supposed to have been towers (towers open at the sides to the portico). Behind this broad porch is a hexagonal court, surrounded by a peristyle, and outside the peristyle deep recesses (an arrangement like an aisle with chapels outside it). Beyond this was the great forecourt of the temple, about 400 ft. square, also with its peristyle and recesses. The temple itself was raised on a podium reached by another flight of steps. The most singular feature is the hexagon court, and if you look at the plan of this with the long portico and two towers in front of it I think you must be struck by its resemblance to the plans of such buildings as the Minerva Medica, at Rome, and San Vitale, at Ravenna, both of which are, however, on a much smaller scale. The long portico with its towers, which was built by Antoninus Pius about 160 A.D., would probably be found to be neither singular nor original if we knew more about Syrian buildings. Herod's temple, erected nearly 180 years earlier, and several others, seem to have had similar porches. Another curious feature at Baalbec, one which is found in other more or less contemporary buildings in the east of the empire, but did not reach Italy until later, is the breaking-up of the entablature into an arch over the middle intercolumniation of the portico, the space being made especially wide for the purpose.

*Persia.*

Of the buildings of Rome's great rival, Persia, we know but little. Of courts and gates I have found one solitary plan. But the entrance to the palace itself under the Sassanian dynasty was too remarkable to be passed over. It consisted of a large and lofty hall, end-on to the front of the building, but recessed into it and vaulted with an elliptical barrel-vault, the major axis of the ellipse being *vertical*. There was no outer wall whatever at the front end, so that the appearance was something like that of a huge cave nearly as high as the wall. This entrance-hall at Ctesiphon was 163 ft. deep by 86 ft. wide and 105 ft. high. At Firouzabad it was 90 ft. deep and 45 ft. wide, and two apartments not very much smaller opened into it on each side in the same cave-like way.*

There is a curious superficial resemblance between the elevations of the front of the palace at Ctesiphon and the front of Lincoln Cathedral. It is only superficial, for the great arch at Lincoln is quite shallow, and one can hardly suppose the resemblance anything but accidental.

* Dimensions from Mr. Spiers' paper in R.I.B.A. *Transactions*, 1891.

*Early Christian.*

In the first few centuries after the great revolution, when Christianity became the State religion of the Roman Empire, and the capital was removed to Byzantium, architecture, in both the east and the west of the empire, was almost wholly occupied with the building and rebuilding of churches. The last remnant of pagan worshippers were eventually scattered by a destruction of the temples as deliberate and as sweeping as was, say, the destruction of images by the reformers in this country. But before that happened the followers of the new religion were already divided on points of doctrine, and during several centuries, as the balance of authority or popularity swayed from one opinion to another, every church in turn was subject to attack, and was sometimes destroyed. In such circumstances it is not surprising that the churches assumed on the outside something of the forbidding aspect of a fortress. Among other things the entrance to every church was guarded by a broad narthex, or porch, and a spacious forecourt—sometimes, in this style, called an atrium. The latter was surrounded by a high wall with a portico or cloister on the inside, the main object being, without doubt, to provide a refuge for defence in times of need for those members of the congregation for whom there was no room in the church. If the particular doctrine professed by that congregation triumphed, the court was promptly filled again with penitents seeking admission or readmission. All the earlier examples of these courts have either disappeared or been rebuilt, and I can only show you the well-known one in front of the church of St. Ambrose, at Milan, which, though it used to be attributed to the IXth century, can hardly be earlier in its present form than the XIIth. It is not so square in plan as seems to have been usual; indeed, it is a double square. And it has cross-vaults and clustered piers.

The proper place for penitents in times of peace was the porch—or, as we call it when it extends across the whole width of the building, the narthex. Since religious revolutions were frequent, and the penitents on every occasion numerous, and since they were sometimes kept a year or two before being readmitted, one can readily understand the necessity for so much space. The narthex of "St. Laurence without the walls" at Rome is unquestionably made up mostly of materials of very early date. The church was built about 330, with a narthex at the other end. But the orientation was reversed in 578, when a new nave was built and the old narthex apparently built up and converted into a sacristy. It is not unlikely that four of the columns which are spirally fluted, and all the ionic caps and entablature came from the old narthex. But they all seem too good even for the IVth century, and were probably, in any case, stolen originally from some classic building. The same is no doubt true of the materials, or the most part of them, making up the narthex of Civita Castellana Cathedral. The central arch is an effort beyond the architectural skill, and out of keeping with architectural style, of 1210 A.D., when the building was erected (as is recorded in two places upon it).

*Mediæval Italy.*

But before the end of the XIIth century the spacious portico of the ancient world, which stretched across the whole width of a building, and was part of it, often the chief part, architecturally, was disappearing in Italy. Having given to the architecture of that country such approaches as the porticos of the Pantheon, St Vitale, S. Ambrogio, and last, but not least, St. Mark's, it had to give way, in deference to the almost universal poverty of the times, to the porch; a feature proportioned to the door and not to the building. I think it is in Street's "Brick and Marble Architecture in Italy" that attention is called to the fact that the porch is a feature confined to the north side of the Alps. And, though that is not strictly true, the porch has never flourished in Italy. There are plenty of those deeply-recessed doorways, of which it is always hard to say whether they should not properly be called porches. But the porch proper is rare, and, with two or three exceptions, is only found in the form of a shallow arched hood tied with an iron rod and resting on two columns: which columns often stand on the backs of lions or griffons. This form lasted from the XIIth to the XVII century, with changes only in ornamental details. On examination a good many of those attributed in guide-books to the XIIth century must be put down to XIIIth or even later. The two at Bergamo are of the XIVth. That on the south side of the church bears, according to Street, the date 1360, and the name of the mason. But some, such as the porches of Modena Cathedral, S. Zeno, at Verona, and others, may very well be work of the latter part of the XIIth century. The south porch at Ancona is possibly of that date, but the west one is almost certainly XIIIth century work. If you look closely at the photograph, too, you will see clear indications, at the springings of the arch, and in some wall shafts outside the porches, that it was once a triple porch, with three doors into the church. I think the irrational idea of putting the columns on lions' backs must, though some critics will not have it, be borrowed from the East, where the fashion is ancient and persistent. The beast, whether lion or griffon, has often another beast or man in his paws, and they are said to represent supporters of the church, or of orthodoxy triumphing over saracens or heretics—a piece of symbolism which would not have seemed so childish to the ignorant and barbarous folk of the XIIth and XIIIth centuries as it does to us.

The most remarkable of Italian church porches is the gigantic one attached to the church of S. Antonio Piacenza, and called "Il Paradiso." The pinnacles and wheel-window are quaint and, I think, pretty. The size and the form of the structure are unique; but how it could acquire the name of "the paradise" is a puzzle. One can only suppose it was different when first built. The buttresses look as if they were additions. Not impossibly it was stuccoed and enriched with paintings. The only other Italian church porch that I know, and that is worth a passing reference, is at the west entrance to Ferrara Cathedral. Like the last, it is unique; but it is its beauty that makes it so. And it must owe its beauty almost certainly to some French mason who, at a later time, added to the regular XIIth or XIIIth century Italian porch an upper story which, as Street said, looks at first sight as if it had been transported from Northern Europe.

*Mediæval France.*

However restricted one may find the subject of porches when dealing with Italy, the same cannot be said of mediæval England and France; where churches and cathedrals afford an endless and varied series of examples, on which, it is the merest platitude to say, the artists concentrated their best work. This section of my subject is, however, so familiar to most of you that I do not propose to go into it at much length.

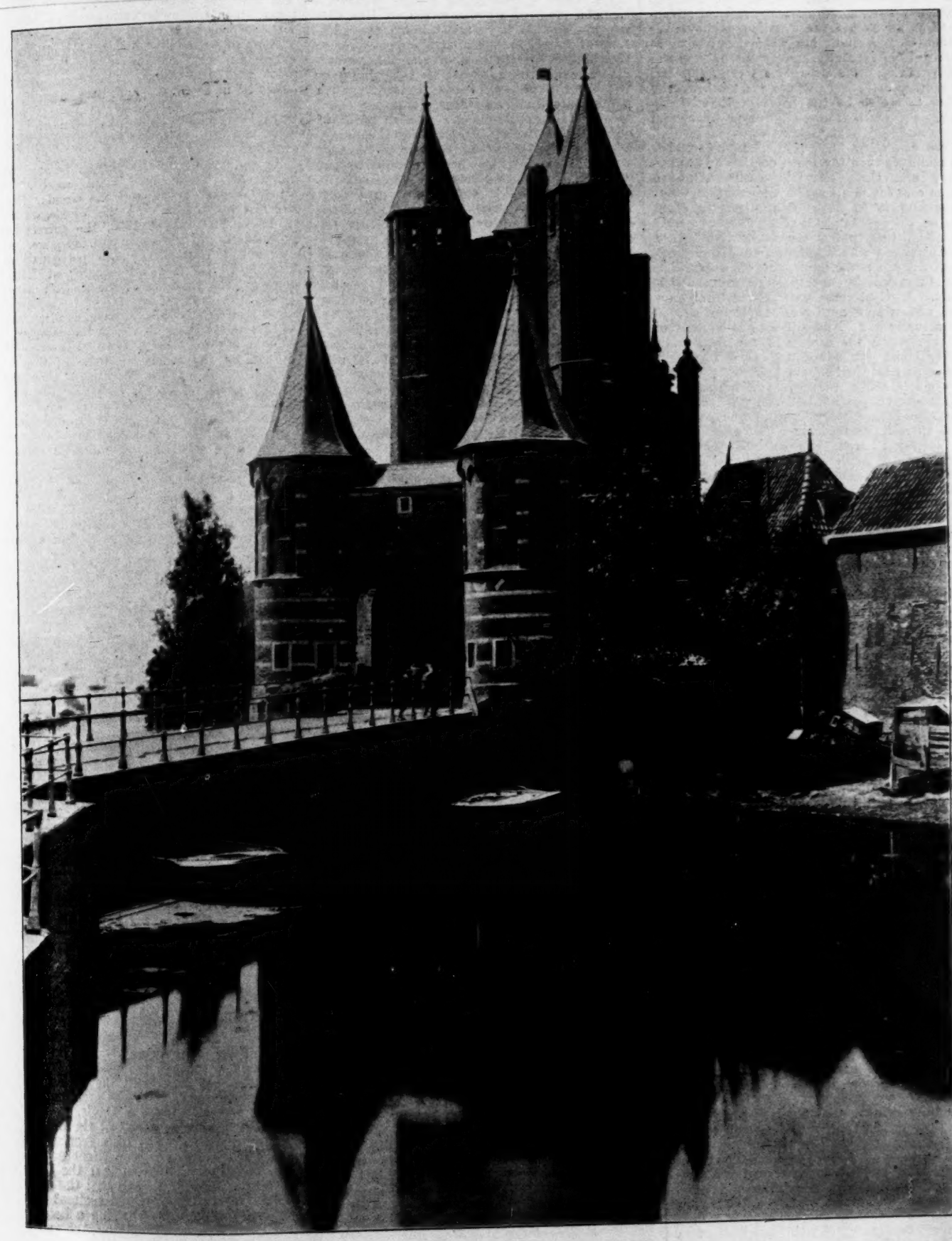
France claims attention first, on account of its superiority in the richness and number of first-rate examples: and also, I think, on account of its having been rather earlier in the field. The magnificent series of the great cathedral porches allied to those at Chartres and Amiens cannot be equalled or approached by any series of existing works of any age or country; either for richness, for beauty, or for a deliberate and spirited effort to lift the mind of the entering worshipper to higher things. It seems to me that their merit is enhanced by the fact that in outward appearance many of them fail to show as porches. Built between salient buttresses, and surmounted by galleries, parapets, and pinnacles, they are artfully confounded with, and form an integral part of, the front. Instead of projections we seem to see deeply-recessed doorways. This series, with its alternating shafts and statues in the jambs, and its sculptured tympanum and central shaft, probably owes its origin to the XIth or XIIth century portals, of which two famous ones in Southern France, at St. Gilles, and at Arles have survived as samples. In its later developments the coping of the gable parapet came down and joined the hood mould at the bottom, and curving upwards ran up into a great finial. And the

space within and around it was filled with light flowing tracery or sculpture. Eventually, as at Tours and St. Riquier, this aspiring moulding was snubbed off, as it were, a little above the top member of the arch, leaving a curiously-shaped panel; and the flamboyant detail melted, almost imperceptibly, into the more classic forms of the François I. style without losing either its richness or its apparent complication.

These triple porches are the typical French Gothic portals, and the telling porch of the little church of St. Maclou, at Rouen, which everyone knows, and which, I think, everyone must admire, may perhaps be considered only a clever variation in plan on much the same theme. There are, of course, other types; and if among the members of the cycle and camera clubs there are any students of Gothic left: or if they get tired of touring their own country, I can strongly recommend them to the village churches of France. They would find a tour there enrich their minds at no great loss to their pockets. At present, as I want to get on to English work, I will only mention one other French porch—an early one at the ruined church of St. Pierre, near Vezelay. It is a low building, three aisled, of the full width of the church, and almost as much projection. It is groined from slight piers internally, and its form reminds one of the Galilee, at Durham. I shall be glad if anyone can explain its purpose to me.

*English Ecclesiastical Gothic.*

Among English Gothic porches, none, of course, can touch the great western portico of Peterborough Cathedral. Indeed, notwithstanding its comparative plainness and simplicity, it is at least as much greater artistically as it is physically than the porches of Chartres. The architecture of the Middle Ages cannot show its equal in Europe, and one must always regret that the genius who conceived it is robbed of a just fame by our ignorance of his identity. Unfortunately, if we looked for other English Gothic porches that anyone could think of comparing with the French ones, we should be driven to rely on the Galilees of Ely and Lincoln. We could justly claim that they owe their beauty;



*The Haarlem Gate, Amsterdam.* (*See page 228.*)

further side of the basilica (from the forum) was the great column, which could be viewed from the galleries surrounding the small court in which it stood; and beyond that again the temple of Trajan.

The whole group of the arch, forum, and basilica, and the small court may reasonably be looked on, from the architectural standpoint, as the approaches to the temple of Trajan, the crowning feature of the most magnificent of Roman works; or the one, at least, which most forcibly struck the imagination of those who, in later times, saw it when partly ruined.

Another finely-conceived approach was created in Rome by that great building emperor, Trajan's successor, Hadrian. It lead to his mausoleum, now called the Castle of St. Angelo, and took the form of a bridge over the Tiber leading from the stone quay on the city side right up to the gate of the mausoleum (the quay on the mausoleum side now buries several arches of the bridge). There were, of course, as in the case of other ancient bridges, arched gateways at the ends, which, like the decorative parts of the mausoleum have disappeared; and if it were not for Bernini's angels the whole affair would now be very tame and uninteresting. The temptation to dwell on Roman approaches of the Classic period is great. They were so well conceived; but they are difficult to illustrate, and I will only mention one other example, that at Baalbec. I do so on account of its many curious and interesting peculiarities.

A flight of over fifty steps, 150 ft. wide, leads up to a front close on 240 ft. long, and consisting of an open portico of the Corinthian order, stopped at the ends by what are supposed to have been towers (towers open at the sides to the portico). Behind this broad porch is a hexagonal court, surrounded by a peristyle, and outside the peristyle deep recesses (an arrangement like an aisle with chapels outside it). Beyond this was the great forecourt of the temple, about 400 ft. square, also with its peristyle and recesses. The temple itself was raised on a podium reached by another flight of steps. The most singular feature is the hexagon court, and if you look at the plan of this with the long portico and two towers in front of it I think you must be struck by its resemblance to the plans of such buildings as the Minerva Medica, at Rome, and San Vitale, at Ravenna, both of which are, however, on a much smaller scale. The long portico with its towers, which was built by Antoninus Pius about 160 A.D., would probably be found to be neither singular nor original if we knew more about Syrian buildings. Herod's temple, erected nearly 180 years earlier, and several others, seem to have had similar porches. Another curious feature at Baalbec, one which is found in other more or less contemporary buildings in the east of the empire, but did not reach Italy until later, is the breaking-up of the entablature into an arch over the middle intercolumniation of the portico, the space being made especially wide for the purpose.

*Persia.*

Of the buildings of Rome's great rival, Persia, we know but little. Of courts and gates I have found one solitary plan. But the entrance to the palace itself under the Sassanian dynasty was too remarkable to be passed over. It consisted of a large and lofty hall, end-on to the front of the building, but recessed into it and vaulted with an elliptical barrel-vault, the major axis of the ellipse being *vertical*. There was no outer wall whatever at the front end, so that the appearance was something like that of a huge cave nearly as high as the wall. This entrance-hall at Ctesiphon was 163 ft. deep by 86 ft. wide and 105 ft. high. At Firouzabad it was 90 ft. deep and 45 ft. wide, and two apartments not very much smaller opened into it on each side in the same cave-like way.*

There is a curious superficial resemblance between the elevations of the front of the palace at Ctesiphon and the front of Lincoln Cathedral. It is only superficial, for the great arch at Lincoln is quite shallow, and one can hardly suppose the resemblance anything but accidental.

* Dimensions from Mr. Spiers' paper in R.I.B.A. *Transactions*, 1891.

*Early Christian.*

In the first few centuries after the great revolution, when Christianity became the State religion of the Roman Empire, and the capital was removed to Byzantium, architecture, in both the east and the west of the empire, was almost wholly occupied with the building and rebuilding of churches. The last remnant of pagan worshippers were eventually scattered by a destruction of the temples as deliberate and as sweeping as was, say, the destruction of images by the reformers in this country. But before that happened the followers of the new religion were already divided on points of doctrine, and during several centuries, as the balance of authority or popularity swayed from one opinion to another, every church in turn was subject to attack, and was sometimes destroyed. In such circumstances it is not surprising that the churches assumed on the outside something of the forbidding aspect of a fortress. Among other things the entrance to every church was guarded by a broad narthex, or porch, and a spacious forecourt—sometimes, in this style, called an atrium. The latter was surrounded by a high wall with a portico or cloister on the inside, the main object being, without doubt, to provide a refuge for defence in times of need for those members of the congregation for whom there was no room in the church. If the particular doctrine professed by that congregation triumphed, the court was promptly filled again with penitents seeking admission or readmission. All the earlier examples of these courts have either disappeared or been rebuilt, and I can only show you the well-known one in front of the church of St. Ambrose, at Milan, which, though it used to be attributed to the IXth century, can hardly be earlier in its present form than the XIIth. It is not so square in plan as seems to have been usual; indeed, it is a double square. And it has cross-vaults and clustered piers.

The proper place for penitents in times of peace was the porch—or, as we call it when it extends across the whole width of the building, the narthex. Since religious revolutions were frequent, and the penitents on every occasion numerous, and since they were sometimes kept a year or two before being readmitted, one can readily understand the necessity for so much space. The narthex of "St. Laurence without the walls" at Rome is unquestionably made up mostly of materials of very early date. The church was built about 330, with a narthex at the other end. But the orientation was reversed in 578, when a new nave was built and the old narthex apparently built up and converted into a sacristy. It is not unlikely that four of the columns which are spirally fluted, and all the ionic caps and entablature came from the old narthex. But they all seem too good even for the IVth century, and were probably, in any case, stolen originally from some classic building. The same is no doubt true of the materials, or the most part of them, making up the narthex of Civita Castellana Cathedral. The central arch is an effort beyond the architectural skill, and out of keeping with architectural style, of 1210 A.D., when the building was erected (as is recorded in two places upon it).

*Mediæval Italy.*

But before the end of the XIIth century the spacious portico of the ancient world, which stretched across the whole width of a building, and was part of it, often the chief part, architecturally, was disappearing in Italy. Having given to the architecture of that country such approaches as the porticos of the Pantheon, St Vitale, S. Ambrogio, and last, but not least, St. Mark's, it had to give way, in deference to the almost universal poverty of the times, to the porch; a feature proportioned to the door and not to the building. I think it is in Street's "Brick and Marble Architecture in Italy" that attention is called to the fact that the porch is a feature confined to the north side of the Alps. And, though that is not strictly true, the porch has never flourished in Italy. There are plenty of those deeply-recessed doorways, of which it is always hard to say whether they should not properly be called porches. But the porch proper is rare, and, with two or three exceptions, is only found in the form of a shallow arched hood tied with an iron rod and resting on two columns: which columns often stand on the backs of lions or griffons. This form lasted from the XIIth to the XVII century, with changes only in ornamental details. On examination a good many of those attributed in guide-books to the XIIth century must be put down to XIIIth or even later. The two at Bergamo are of the XIVth. That on the south side of the church bears, according to Street, the date 1360, and the name of the mason. But some, such as the porches of Modena Cathedral, S. Zeno, at Verona, and others, may very well be work of the latter part of the XIIth century. The south porch at Ancona is possibly of that date, but the west one is almost certainly XIIIth century work. If you look closely at the photograph, too, you will see clear indications, at the springings of the arch, and in some wall shafts outside the porches, that it was once a triple porch, with three doors into the church. I think the irrational idea of putting the columns on lions' backs must, though some critics will not have it, be borrowed from the East, where the fashion is ancient and persistent. The beast, whether lion or griffon, has often another beast or man in his paws, and they are said to represent supporters of the church, or of orthodoxy triumphing over saracens or heretics—a piece of symbolism which would not have seemed so childish to the ignorant and barbarous folk of the XIIth and XIIIth centuries as it does to us.

The most remarkable of Italian church porches is the gigantic one attached to the church of S. Antonio Piacenza, and called "Il Paradiso." The pinnacles and wheel-window are quaint and, I think, pretty. The size and the form of the structure are unique; but how it could acquire the name of "the paradise" is a puzzle. One can only suppose it was different when first built. The buttresses look as if they were additions. Not impossibly it was stuccoed and enriched with paintings. The only other Italian church porch that I know, and that is worth a passing reference, is at the west entrance to Ferrara Cathedral. Like the last, it is unique; but it is its beauty that makes it so. And it must owe its beauty almost certainly to some French mason who, at a later time, added to the regular XIIth or XIIIth century Italian porch an upper story which, as Street said, looks at first sight as if it had been transported from Northern Europe.

*Mediæval France.*

However restricted one may find the subject of porches when dealing with Italy, the same cannot be said of mediæval England and France; where churches and cathedrals afford an endless and varied series of examples, on which, it is the merest platitude to say, the artists concentrated their best work. This section of my subject is, however, so familiar to most of you that I do not propose to go into it at much length.

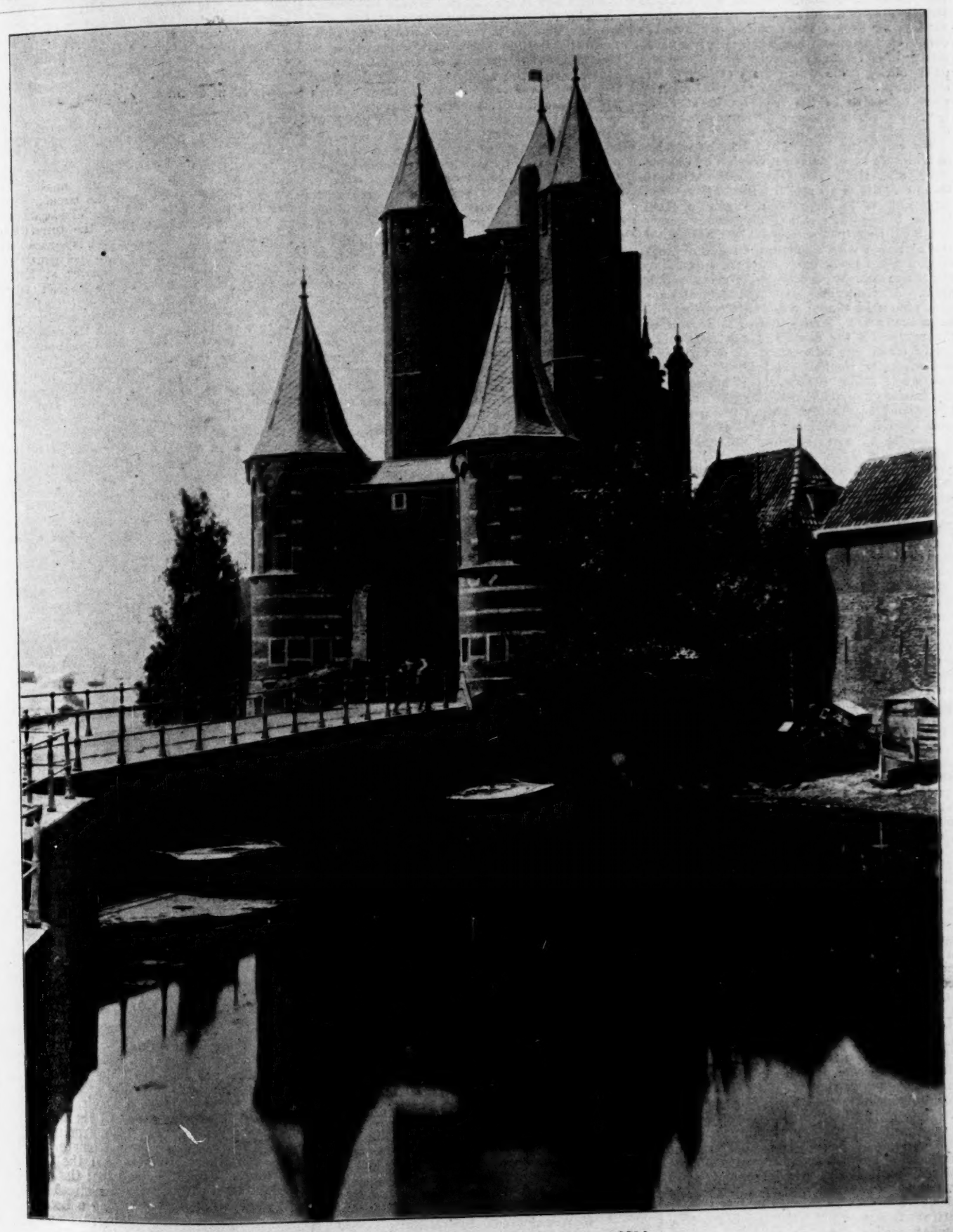
France claims attention first, on account of its superiority in the richness and number of first-rate examples: and also, I think, on account of its having been rather earlier in the field. The magnificent series of the great cathedral porches allied to those at Chartres and Amiens cannot be equalled or approached by any series of existing works of any age or country; either for richness, for beauty, or for a deliberate and spirited effort to lift the mind of the entering worshipper to higher things. It seems to me that their merit is enhanced by the fact that in outward appearance many of them fail to show as porches. Built between salient buttresses, and surmounted by galleries, parapets, and pinnacles, they are artfully confounded with, and form an integral part of, the front. Instead of projections we seem to see deeply-recessed doorways. This series, with its alternating shafts and statues in the jambs, and its sculptured tympanum and central shaft, probably owes its origin to the XIth or XIIth century portals, of which two famous ones in Southern France, at St. Gilles, and at Arles have survived as samples. In its later developments the coping of the gable parapet came down and joined the hood mould at the bottom, and curving upwards ran up into a great finial. And the

space within and around it was filled with light flowing tracery or sculpture. Eventually, as at Tours and St. Riquier, this aspiring moulding was snubbed off, as it were, a little above the top member of the arch, leaving a curiously-shaped panel; and the flamboyant detail melted, almost imperceptibly, into the more classic forms of the François I. style without losing either its richness or its apparent complication.

These triple porches are the typical French Gothic portals, and the telling porch of the little church of St. Maclou, at Rouen, which everyone knows, and which, I think, everyone must admire, may perhaps be considered only a clever variation in plan on much the same theme. There are, of course, other types; and if among the members of the cycle and camera clubs there are any students of Gothic left: or if they get tired of touring their own country, I can strongly recommend them to the village churches of France. They would find a tour there enrich their minds at no great loss to their pockets. At present, as I want to get on to English work, I will only mention one other French porch—an early one at the ruined church of St. Pierre, near Vezelay. It is a low building, three aisled, of the full width of the church, and almost as much projection. It is groined from slight piers internally, and its form reminds one of the Galilee, at Durham. I shall be glad if anyone can explain its purpose to me.

*English Ecclesiastical Gothic.*

Among English Gothic porches, none, of course, can touch the great western portico of Peterborough Cathedral. Indeed, notwithstanding its comparative plainness and simplicity, it is at least as much greater artistically as it is physically than the porches of Chartres. The architecture of the Middle Ages cannot show its equal in Europe, and one must always regret that the genius who conceived it is robbed of a just fame by our ignorance of his identity. Unfortunately, if we looked for other English Gothic porches that anyone could think of comparing with the French ones, we should be driven to rely on the Galilees of Ely and Lincoln. We could justly claim that they owe their beauty;



*The Haarlem Gate, Amsterdam.* (*See page 228.*)

not to the profusion and the intricacy of ornament on which the French examples largely depend; but to the more solid architectural qualities of restraint in design and an almost Greek refinement of details, especially of the mouldings (the French masons never touched the English in their mouldings). The difference is typical of that between French and English Gothic as a whole; perhaps of that between the characters of the two nations. We should have to confess, on the contrary, that the chief beauties of these two porches are almost lost to the casual observer by being hidden in somewhat dark interiors. That is possibly due to our climate suggesting more strongly an enclosed porch. But it seems typical, too, of our national tendency to seize on a slight practical advantage as an excuse for avoiding display. We call it common sense; but when it is not parsimony it is generally merely the nervousness of a touchy pride which fears criticism. Of our other cathedral porches the most worthy seem to me to be the triple porch at Salisbury, the south transept porch at York, and the south porch at Gloucester.

We can show no English examples richer in sculpture than the south porches of Canterbury and Gloucester cathedrals. And in those cases it is all modern restoration. But supposing it to have been originally equal to, or better than, the best French work: and admitting that at Gloucester it is placed and arranged with admirable taste and judgment: it can never have made these box-like structures worthy entrances to great cathedrals. At Canterbury the architectural lines and proportions are quite uninteresting, if not actually bad. And although at Gloucester the reverse is the case, and the work may justly claim our admiration as a very fine and typically English example, it does not rise much above the level of innumerable parish church porches all over the country. The grand three-story south porch of Burford Church, Oxfordshire, the south porch of Beccles Church, Suffolk, and the well-known south porch of St. Nicholas, King's Lynn, which all belong to much the same period (called in the guide-books the Perpendicular), must have been very nearly as rich and beautiful bef e their images were destroyed. The north porch of Thaxted Church, Essex, though less sumptuously ornamented, is better proportioned and more satisfying to one's architectural instincts than either.

The south porch of the same church is also interesting on account of its great projection which allows of entrance arches as well as windows in the sides. The south porch of Boxford Church, near Sudbury, is another very fine example of the same period, though only one story high. If one were seeking to classify late English porches, all these, except the Beccles example, might be distinguished by the cornice and parapet forming a low-pitched gable. Whether that means a rather earlier date or only another type does not, perhaps, much matter. But, in the eastern counties, with which I am best acquainted, most of the numerous porches that date from the latter half of the XVth century are finished at the top by horizontal lines. The south porch of Southwold Church is typical, and perhaps the finest example of a class which is very common all over the coast country of Norfolk and the north of Suffolk, and far inland on the borders of the two counties. These porches would be effective in any case on account of the fine proportions of the whole, and of every part. But they owe their richness to the peculiar form of decoration employed, which is produced by letting very thin flakes of black flint into the surface of flat stonework. All the panelling, the tracery, the letters and monograms are formed in this way. The flint flakes are chipped away from the back to form a knife-like edge, which can then be trimmed to shape, and the hollows in which they are set are so shallow as to be scarcely perceptible where the flakes have fallen out. But, owing to the contrast of colour, the effect, so long as they remain, is nearly equal to that of pierced work. The same decoration is applied to other parts of the buildings, particularly to plinths and parapets, and the spaces between clearstory windows; but that is another matter. Very beautiful two-story church porches of a somewhat earlier date are to be found at Northleach, Gloucestershire, Leverington, Norfolk, and St. Margaret's, Leicester, among other places. The porches without an upper story are usually less effective. But there is a very fine one of the middle period at St. Mary's, Beverley, which is illustrated in Rickman, and some of the early XIIIth century ones, now ruined, such as those at West Walton, Norfolk, and Higham Ferrars, Northampton, must have been exceedingly rich internally. The porch of the Temple Church in London is unique, to the best of my knowledge, and forms a class by itself. The typical late English church porch of the larger sort must be referred back for its type and origin to such Norman examples as the north porch of Southwell Minster.

But there is also among village churches a common class of wooden porch of late date which seems to have arisen from the addition of what one may call screen-work to the timber construction of the village carpenter—with the addition of a moulding or two on the arrises of the timbers. Such porches are usually so ruined that the existence in fair condition of a wooden porch of obviously earlier date is rather surprising. If I had not seen the north porch at Boxford myself, I should have been tempted to put it down to some restorer; the more, since it is such an imitation of a stone porch with vaulting and window tracery complete as one does not readily put to the credit (or discredit) of our forefathers. It is probably unique: it must be badly decayed; and it is to be hoped that some young man, with time for such things, will make a careful measured drawing of it at once before it is either pulled down or "restored."

There is one more English church porch that must be mentioned before leaving that branch of my subject, though it is not Gothic. It is the familiar porch of St. Mary's, Oxford. In the present condition of architectural taste I am tempted to characterise it as the most beautiful of all.

The precincts of all great ecclesiastical and conventual establishments were, of course, walled in; and the approaches guarded by gates or gatehouses, having more or less architectural character. A very large number of these remain, especially in our cathedral cities. But the diversity of their forms and characters rather bewilders anyone who tries to describe them, and entirely precludes classification. Between the grand, but heavy and forbidding, XIVth century gatehouse on the hill at Ely, which I suppose most of us know, and the light and gracious late structure at Worcester, with its panelling and its gallery of windows, there is almost every conceivable form, and every degree of ornamentation. Both these have level parapets, but gables are more common, and seem most appropriate when turned to the front. Occasionally they face the sides, and occasionally both front and sides. A large number have but one opening; or had but one originally (a second has sometimes been made in modern times). A few only had two openings, a larger one for wheeled traffic and a smaller for foot passengers (like the holes for the cat and the kitten which legend says Sir Isaac Newton made in his door). The Worcester gate is the only one I can remember with three. As seems natural and proper, the outside is usually plainer or sterner-looking than the other, though where there is a lodging over the gate, as there more often is than not, there is generally a window on the outside for a look-out. I have chosen the Worksop Abbey gate for illustration, partly as being more or less typical, but mainly on account of its gables, which make a good architectural group, and for the incidental interest of some remains of an old cross just outside the gate. Norwich possesses two gates which are of exceptional interest on account of their unusually rich and symmetrical design. The earlier is the Ethelbert gate, built about the last quarter of the XIIIth century, a really fine piece of work, but much spoiled by an incongruous and absurdly ugly modern parapet of flint inlay. The other, the Erpingham gate, built by Sir Thomas Erpingham, who figures in Shakspeare's "Henry V.," if less vigorous in design is almost as elaborately decorative and is not spoiled by any modern addition.

*Mediæval Cities and Castles.*

Of an altogether different class, and much more formidable, were the gates that guarded the approaches to the castles and cities of mediæval Europe. And of these, again, a much larger number remain even in this country than it is possible to refer to in a single paper. The earliest form of such gates in England is to be seen in the ruins of some of the Norman castles, which were built before any of the fortifications of towns; at any rate, before any that are now left. It consisted of a narrow gateway in a lofty tower, the front being occupied chiefly by two enormous turrets, circular on plan, flanking and appearing to crowd and threaten the gate; as, indeed, they were meant to do. The tower was, of course, crowned with machicolations and parapets. The base was battered to facilitate the attentions which the owner desired to pay to unwelcome visitors. And the gateway was further protected by an iron portcullis, and, except in very inaccessible situations, by a moat and drawbridge. This form of gate persisted in essential particulars in most city and castle gates; and later, in mansion gateways in England up to the reign of Elizabeth, and is to be found even in the XVIIth century.

As time went on the turrets became less important. They were made smaller, or placed further apart, and the circular form was less insisted on. In the Micklegate bar at York, built about 1300, the turrets are quite small, and the lower part is square. At Caernarvon Castle they are polygonal; at Alnwick Castle they are square; at Harstmonceux, the youngest of the English castles (1446), the turrets are fanciful; octagonal below and circular above, with smaller circular turrets standing up within the parapets.

There are few things more picturesque to be seen by the tourist in some of the unspoiled towns of the Continent than the old city gates. I do not envy the man with a brush, a pencil, or even a camera, who could see the Haarlem Gate at Amsterdam (see page 227) and leave it alone, however often he may have seen illustrations of it before. It may be that there is not really much in it in the way of architectural detail, but it groups splendidly; there is the most delicately-graduated light and shade, and there is colour, to say nothing of a bridge and water in the foreground. What more can a man want?

The bridge and the water *do* make a difference. I doubt if people would think so much of the gatehouse at the bridge-end at Prague, which we often see sketches of, if there were no bridge. Many of the old French and German towns, and especially the towns of Holland and Belgium, can boast gates which, in other respects, are as picturesque, but we rarely see drawings of them. Germany is especially rich in city gates, and has even some early Renaissance examples, which are, however, more or less heavy, coarse, and ugly. Our own charming little "Temple Bar" is possibly unknown to some of the younger men; it is worth a journey to Waltham to see.

[The remainder of Mr. Baggallay's paper and some notes of the discussion which followed, will be given next week.]

## THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

### III.—THE RITZ HOTEL, PICCADILLY, W.

THE growing desire for hotel life has in recent years found marked expression in many of the large buildings in the West-end of London. The latest, and in some respects the most important, example is the Ritz Hotel, now nearing completion, of which an inspection was made by a numerous body of members of the Architectural Association on Saturday afternoon, February 24, the occasion of the third spring visit. The party was conducted through the building by Mr. Bishop, who has supervised the entire erection and collaborated with the architects for the work, Messrs. Mewes & Davis.

The most interesting aspect of the building lies in the planning. The main frontage, of some 232 ft., suggests a proportionate depth of site, but when it is seen that the Green Park front is only 87 ft. and that the corresponding return in Arlington-street but 102 ft., the problem of scheming a hotel to conform to the London Building Act and at the same time to show financial justification is one of considerable difficulty.

Accommodation is made for 160 to 180 guests and their servants, in addition to a large hotel staff, and the whole is distributed over nine stories. The entrance to the hotel is placed on the Arlington-street side, where the usual revolving door will be erected. To the left is the main staircase, while immediately in front is a long corridor or lounge extending to a large restaurant at the other end of the site facing the park; windows and doors are arranged so that a view of the trees in the park may be obtained upon entering. About halfway in the length of this corridor on the left, a top-lighted winter garden is planned opposite to the Piccadilly entrance on the right. This latter entrance is intended to serve the banqueting-hall and private dining-room in the basement, and the restaurant and ladies' dining-room on the ground floor, and thus keeps the hotel and the outside business distinct.

A mezzanine or lower ground floor is wholly a service floor, containing kitchen, sculleries, pantries, and stores, while the remaining parts of the basement not used by diners are set apart for boiler-house, ventilating appliances, ice-making plant, water-pumping house, and staff dining-rooms.

In addition to the departments already named, the ground floor has provision for office, etc., passenger lifts, and six shops in the eastern half of the Piccadilly front.

The upper floors from the first to the sixth contain bed, sitting, and bath rooms and rooms for visiting servants. The principal rooms are arranged in suites extending throughout the north and west façades, so that the whole floor can be let as a single suite, without communication with the main corridor. These servants' rooms, although enjoying the sunny aspect and overlooking the inner court, are placed on the south side of the main corridor in juxtaposition to their respective suites of rooms. Small internal areas provide light and air to the bathrooms and passages. The seventh floor is occupied as staff bedrooms.

Our readers will be familiar with the buildings which formerly stood upon the site, notably Walsingham House and the Bath House Hotel. The new building has a considerably deeper basement, the foundations in certain cases reaching to 36 ft. below street level. Difficulties in drainage arose, so that it became necessary to carry an independent sewer from Arlington-street into St. James's-street, and the public sewer was entered near Park-place.

Some interesting methods of construction were utilised to overcome difficulties. For instance, the south wall, adjoining Wimborne House, is carried upon girders cantilevered from an iron grillage foundation some 6 ft. inside the boundary line. This was done to avoid interference with the bases of the walls of Wimborne House. The construction is that of a steel-framed building faced with Portland stone, roofed with asphalt and Westmorland slates; the ground story is built in Norwegian granite. Generally speaking, no wall is more than one story in height, each being carried on a steel girder, so that a wall may at any time be removed for an alteration without affecting the structure above or below.

The introduction of an arcade upon the pavement of a great London street is a matter of importance and arose in quite a natural way. The promoters of the enterprise were desired by the London County Council to set back the new frontage line as part of the general widening of Piccadilly, but the loss of space ruined the financial aspect of the undertaking. The alternatives therefore resolved themselves into the Council acquiring the whole site or giving permission to build over the public footway. The latter was accepted, and the arcade became necessary. The simplicity and strength given to the treatment of the feature are suitable elements in the design. The flatness of the main façade is perhaps devoid of interest, but the strong and massive handling of the stonework is good. The character of the design throughout the building is modern French Renaissance, the desire for which, and, indeed, much other work involving matters of taste, is very prevalent. The interior has the walls of its main stairs, halls, and corridors finished with the popular "stuc," a stone-like rendering, on which artificial jointing is made. There is perhaps an idea of monotony in the effects, which future gilding may relieve. The ground floor restaurant has interesting marbles upon the walls, but the lower dining-halls, although finished with ornamental plastering, require some colour. The spectator is bored by the perpetual use of the semi-elliptical arch, which is not the most constructive form, although providing easy escape from certain difficulties of internal proportions.

## THE SURVEYORS' INSTITUTION.

AN ordinary general meeting of the Surveyors' Institution was held on Monday at No. 12, Great George-street, Westminster, S.W., Mr. C. Bidwell, President, in the chair.

### *The Assimilation of the Practice of Quantity Surveyors.*

After the usual preliminary business, a paper was read by Mr. H. J. Leaning, prepared by the late John Leaning, on "The Assimilation of the Practice of Quantity Surveyors." The Chairman, in calling on Mr. Leaning, expressed his own regret and the regret of the meeting that death had prevented the author from reading the paper himself.

The author stated that the importance of the work of the quantity surveyor, the multitude of new inventions connected with building, the specialisation of various branches of the building trade, the preternatural sharpening of the wits of the builder's estimating clerk, and the general rise in the public expectation of what an architect should know, all combined to accentuate the distinction between the architect and the quantity surveyor. There were a number of powerful reasons why the architect should not supply quantities for his own works, perhaps the strongest being that it tended to subvert that impartial treatment of the building owner and the contractor which should be the architect's leading principle, and which (as experience showed) was often seriously impaired by his assuming the position of quantity surveyor. A logical corollary to this proposition was that the quantity surveyor should not practise as an architect. The desire for uniformity in the practice of quantity surveyors throughout the Kingdom was not new, but the movement had hitherto made little progress. The movers in the direction of uniformity had hitherto been occupied mainly in the consideration of the legal relations of the quantity surveyor with the employer, the architect, and the builder; these relations had been pretty clearly settled by legal decisions, and might very well be left to the operation of the common law, but, whether this was so or not, any desirable change in these relations could be best effected by a consensus of opinion and united action by all the quantity surveyors of the kingdom. The advocates of what had been called uniformity of practice appeared to adopt various views as to the degree and nature of the changes which might be desirable. The Report of the Committee on the Employment of Surveyors (Royal Institute of British Architects, 1872) dealt with the questions of uniformity of measurement, the making the quantities a part of the contract, the appointment of the surveyor, and the supply by the architect of quantities for his own works. The respected Past-President of the Institution (Mr. Thomas Rickman), in a paper read (1890) before the Sheffield Society of Architects and Surveyors, "On the Present State of Questions Relating to Quantities," had also dealt with questions affecting the quantity surveyor, and Mr. Henry Blackburn and Mr. Henry Northcroft had, in Volume X. of the *Professional Notes*, advocated a combined effort for uniformity, and suggested the form it should take. There were four leading systems in England and Scotland (quantities in Ireland were, he believed, for the most part supplied by English surveyors)—viz., London, Manchester, Edinburgh, and Glasgow. London and the southern counties had no published code of practice. The Manchester Society of Architects published a "general statement of the methods recommended by the society to be used in taking quantities and measuring up works." Edinburgh, as the result of the united deliberations of their "ordained surveyors" and master builders, had published rules and regulations for the measurement of excavation, masonry, brickwork, carpentry, joinery. In Glasgow, the representatives of the "measures" and the master builders had agreed upon regulations for the measurement of the following trades: Excavation, masonry, brickwork, carpentry ("wrightwork"), joinery ("wrightwork"), glazing, slating, tiling, plumbing, plastering, painting. The Masters' Association of Glasgow and its neighbourhood had also drawn up certain regulations as to the time which should be allowed for the completion of measurements. The architects and builders of Aberdeen had also published a set of suggestions for the measurement and billing of excavation, masonry, brickwork, carpentry, and joinery. Among the causes of diversity of practice were:—(1) The different systems of contracting, (2) the different modes of measurement, and (3) the different arrangement of the bills.

#### *The Different Systems of Contracting.*

In London and the southern counties the system of a single contractor for a building was the prevalent one. Quantities were almost always supplied, and might be a part of the contract or not. In the country, although the system of one contractor was the rule, he often contracted with other tradesmen, such as plasterer, slater, mason, plumber, etc., who did a part of the work, although as a rule the architect would not deal with the sub-contractor, and usually knew nothing of him. In Manchester the system of employing one contractor, or a contractor for each trade, or a contractor for several trades (not the whole) was in use. Quantities were nearly always supplied, and might be a part of the contract or not. In Edinburgh the system was similar to that of Manchester—either the work was let to one contractor or in groups of trades, as excavator, mason and bricklayer, carpenter and joiner, smith and founder, or in single trades. In Glasgow the system was similar to that in Edinburgh, but the quantities were practically part of the contract, as the whole was first measured and priced and, after completion, remeasured and priced again at the rates of the original schedules.

#### *Differing Modes of Measurement.*

He had prepared a tabulated comparison of the different methods of measurement in London, Manchester, Edinburgh, and Glasgow, which showed the leading differences in the various localities; there were others, but these were sufficient to indicate the task of the reformer. In a paper it was only possible to allude to these in a general way. A few of these, as distinguished from London practice, were as follows:—The practice of making material pay for labour was common, as when the surveyor made no deduction for voids of less than an agreed superficial area. This custom was to be deprecated, net finished quantities of labour and material should be presented in the bill, and everything which had a value should be measured and stated in the bill. The various points of interest were:—

"The general use of the superficial yard instead of the superficial foot or the square of 100 ft.

The measurement of labour to openings and plumbings of angles and jambs.

The measurement of brickwork by the yard instead of the rod reduced.

The separation of various thicknesses of walling and the treatment of deductions.

The more elaborate measurement of stone walling, the reduction to a standard thickness, and the greater number of distinctions therein.

The measurement of stone and labour together by the lineal foot, with sketches.

The numbering of pieces of stone of various shapes, with sketches, instead of measuring the stone per foot cube or superficial, and the labour by the foot superficial or the foot run.

In Edinburgh and Glasgow the distinctions between sizes of stone, and the measurement of every hewn stone, first as rubble, and making no deduction.

The measurement of timbers by the superficial yard, stating their size and distance apart, instead of per foot cube.

Measuring timber and labour separately or per foot run, stating size and labour.

The separation of deals and battens used for carcasing from the timber sawn out of log.

Tiling by the superficial yard instead of the square, failure to deduct certain voids, measurement of cuttings as extra value instead of adding a quantity to the net superficial measurement.

Slating by the yard, and different allowances for cutting.

The inclusion of grounds with lineal items of joinery.

The general measurement of joinery.

The specific description of various items of scaffolding.

The failure to deduct certain voids in the plastering, and measuring labour to hollows.

The treatment of structural metal work.
Measuring and billing lead per foot superficial and per foot run.
Measuring lead in sinks and cisterns per foot superficial, to include soldered angles.
Lead pipes, including branch joints, etc."

No doubt much of this practice was the result of local custom. In London units of measurement were mainly referable to the way the merchant charged for the material or the way the mechanic was paid for labour only. The components of concrete, sand, gravel, and lime were bought by the cubic yard; stone and terra-cotta by the cubic foot; timber by the load, from which the price per cubic foot was readily derived; deals and battens by the St. Petersburg standard, from which the price per superficial foot was easily calculated; flooring and rough boarding by the square of 100 ft.; lead by the hundredweight. Plasterers' and painters' labour was paid by the yard. Asphalt brick, and tile paving was laid by the yard, etc. On these ground the presentation of the items in their ordinary form was logical enough. Uniformity could only be obtained by taking broad views, ignoring unessential differences, and by the adoption of the principle of describing items in such a way as to be most readily priced by the majority. The author then suggested a few of the compromises which appeared to him to be reasonable, and which might be adopted as being as easy to price as the present. These were not intrinsically better, but they would be evidence that surveyors did not wish to impose their London system intact.

The measurement of the net quantity of labour and materials in every case, the deduction of all labour and materials at voids, and, consequently, the discontinuance of all allowances of superficial quantity of labour and materials to cover the cost of extra labour.

The avoidance by the quantity surveyor of responsibility which was not properly his, as, for instance, stating the nature of the soil.

The concentration in the preliminary bill of all general items when there was one contractor for the whole work

The adoption of the yard as a superficial unit instead of the foot or the square.

The adoption of the lineal foot for all lineal measures.

*Excavator.*—Discontinuance of the allowance for slopes or batter, measuring instead strutting and planking, with the proviso "if required."

*Bricklayer.*—The uniform adoption of the superficial yard as the unit for all brickwork; all, except one-brick walls fair on both sides and half-brick partitions, to be reduced to one-and-a-half-brick thickness.

The measurement of all salient angles per foot run for plumbing.

The measurement of all salient angles of reveals of openings per foot run.

*Mason.*—The Scottish masons were a class of capable men, and their conclusions about the measurement of stonework were to be respected; a number of their distinctions as to size of stones were, he believed, the result of quarry regulations, but, in a building with much stone in its construction, the small stones would probably tend to balance the extra value of the larger ones.

He did not think the London practice in the measurement of masonry—*i.e.*, the stone per foot cube and the labours superficial and lineal—could be improved upon. By that system the surveyor had done what had to be done afterwards by the estimator when an item was presented in the bill with a sketch. Making the price of masonry include plain beds and joints and preliminary faces would, he thought, be a step in the right direction.

*Rubble-walling.*—The Scottish practice as to rubble-walling appeared to be reasonable, except in the measurement of all the worked stone, first as rubble and making no deduction for it. He inclined to the opinion that the London practice was simpler and just as easy to price, and, in respect of measuring, the net cubic quantity was superior to an imaginary one.

*Tiler and Slater.*—Instead of allowing superficial quantity for cutting, the items might be uniformly run and described by the lineal yard, such as "extra on ordinary tiling for hip and valley tiles, including all cutting and waste."

"Raking, cutting, and waste to hip and valley, one side measured, etc."

*Carpentry.*—Our measurement of carpentry was, he thought, susceptible of improvement. The uniform adoption of finished sizes, clearer distinction as to fir framed in various ways, the distinction of fir sawn out of log from deals and battens, and the counting of all trimmings (often ignored) would be advantageous. He did not think the billing of timber could be made clearer by any other method than the cubic foot, nor by departing from the principle of categories, nor by distinguishing framing to hips and valleys and similar items, especially in consideration of the fact that a carpenter would readily make a sub-contract for the labour to the carcasing of a whole building at a uniform price per foot cube.

In some parts of the country timber was billed by the cubic foot followed by the description of the scantlings comprised by the total, as, for instance, "800 ft. cube fir framed in plates, floor joists, and bearers (in deal scantlings 4½ in. by 3 in., 6 in. by 2 in., 7 in. by 2 in., 5½ in. by 3 in., 7 in. by 2½ in.)."

*Joinery and Ironmongery.*—As in carpentry, he advocated the adoption of finished sizes and the substitution of the yard for the square: in other respects he did not think the London method of measuring joinery could be improved.

*Plastering.*—There was not much to reconcile between the systems. In Edinburgh and Glasgow, apparently, the lathing for plasterer was separated from the plaster float and set, and billed with the carpentry.

*Founder and Smith.*—The London practice of concentrating the structural metal work into a few totals appeared preferable to the billing joists by the foot run, and took far less time to price, and our general custom of reducing the metal articles to weight was a logical result of merchants' quotations.

*Plumbing.*—The distinctions of lead work in a well-prepared London bill and its method generally would not, he thought, be improved by the adoption of any of the provincial arrangements.

*Glazier.*—This appeared to be treated in a similar manner throughout the kingdom.

*Painting.*—This appeared to be similarly treated everywhere; the provincial method of measuring iron balustrades and sashes and frames over all was not, he thought, to be commended.

*Billing.*—Before comparing the various forms of bills of quantities, one naturally asked what were the characteristic merits of an ideal bill of quantities. They were, he thought, the following:—

"1. Precision of description, which goes far to prevent extras, assists the pricing of items of variation, and preserves the building owner from legal difficulties.
2. Brevity, so far as consistent with clearness of description, because it saves the time of the estimator, who probably prices a large number of bills of quantities in the course of the year, and whose time is usually valuable.
3. Presentation of the items in the form easiest to price, and consequently saving the estimator the trouble of analysis.
4. A settled order of the items for facility of reference."

The degree of detail which the surveyor should adopt required judgment; the measurement of insignificant, almost valueless items—over-refinement in fact—was the temptation which beset the surveyor of exact mind. The difficulty of deciding when to stop was increased by the extraordinary claims made by some surveyors' and builders' clerks, who alleged imperfect descriptions. The expert estimator rejected many refinements as frivolous, and did not price them, but, if surveyors omitted them, was ready enough to make claims for their value. The only safety for the surveyor was a thorough knowledge of prices.

In London practice three documents were the rule—the drawings, the specification, and the bill of quantities, and as a rule the quantity of one kind of material and labour, as "1½-in. four-square-panel door," for instance, appeared in one item, irrespective of its position in the building; the specification settled that.

The preamble to each trade comprised sufficient information as to the materials and workmanship.

In other parts of the country the quantities and specification were often combined in one document. The work in each trade in one part of the building was kept separate from that in another, under distinguishing headings, as basement, ground floor, first floor, etc., and the specification items relating to each trade were written in the preamble to that trade; the position of the work was fixed by the headings of the separate sections of the bills. The estimator was thus subjected to the trouble of pricing an item of the same kind in a number of different places, and if his tender was unsuccessful he had been involved in the reading of conditions which concerned him by little. In Scottish bills of quantities one saw such arrangements as the following:—Separate sections for the timbers and boarding of each roof or flat, the joinery of particular apartments, an oriel window in all trades except plumber, glazier, painter, etc. The result of these arrangements was to make the bill inordinately long. The majority of the items of a bill of quantities were of the same value whether in one part of a building or another, and if one rejected the principle of combining quantities and specification the indication of position might as a rule be abandoned.

The practice of getting a separate tender for the work in each trade also contributed greatly to lengthen the bill of quantities, as a number of items must be inserted in the bill of each trade, which in the case of a tender by a single contractor were once for all included in the preliminary bill. In many of the bills the principle—pretty generally adopted in London billing—of ignoring anything under 6 in. in a total, and calling 6 in. or over in a total another foot, was unknown; we saw such items as 5 ft. 9 in., 6 ft. 6 in., 4 ft. 3 in., 3 ft. 2 in., etc.

In addition to these well-known leading systems there were architects all over the country adopting modifications or combinations of them all. A comparison of the relative advantages of a contract with one contractor for all trades and a separate contract for each trade was perhaps irrelevant; but one might say in passing that the London architect preferred the former, because the responsibility for the work was that of one man instead of a number of men, the conflict of interests of the various trades was avoided, the business of giving certificates and the supervision were less troublesome, and the sole contractor was usually a more substantial and responsible man than such as tendered for one trade. Moreover, the large firm commonly did better work than the small man, and was much more likely, once he had begun, to finish it.

### *Uniformity.*

As to uniformity, he thought they would agree with him that settled and uniform practice was a great element of strength to any profession. The divided counsels of London, Manchester, Edinburgh, and Glasgow were sources of weakness to the quantity surveyors as a body. Unity of purpose and action would ensure a degree of influence and consideration far beyond anything to which their order had yet attained, and withal an extension of that good fellowship which was so essential to their efforts. The establishment of unvarying and uniform custom would, beside other advantages, furnish very strong arguments in defence of points of practice which might be questioned. The quantity surveyor had already done much to settle the mechanism of contracting and to smooth and improve the relations of the various parties to a contract. He would deserve well of posterity if he succeeded in reconciling the differences such as they were now considering. Some of the differences between methods of measurement were considerable, some were insignificant. Some of the methods of the London surveyor might probably be readily adopted by the provincial societies, and the London surveyor could certainly use some of theirs with advantage, such as the measurement of brickwork and other work by the yard, measuring labour to openings and reveals and angles and the like. There was a disposition to vaunt the superiority of the London quantities to a degree which was not warranted. The codes of measurement of Manchester, Edinburgh, and Glasgow were, in his opinion, very creditable performances.

The task of the reformer, its successful conduct and completion, would be tedious

and difficult. It would involve the investigation, reconciliation, and adjustment of the various modes of measurement, and the settlement of two forms of bill, one adapted to a contract with separate trades, the other to a contract with a sole contractor. Probably the customary local bill, if well done, was best understood by the local man, but there were few parts of the country where a London bill would be misunderstood, and in many cases it was welcomed. Radical alterations in billing would probably be resisted by builders accustomed to pricing items billed in a particular way—indeed, many of them would find it difficult to price an item presented in a new fashion. It should be remembered that in any attempt which might be made they had to conciliate not only the surveyors and architects concerned in the four competing systems, but also the builders of their districts, and, in the case of Edinburgh, the board of examiners of the ordained surveyors would have to be convinced of the necessity of changes. It should also be remembered that the architect usually appointed the quantity surveyor, and that the concurrence of the architects would be not only valuable, but necessary.

---

Mr. H. T. Steward, in proposing a vote of thanks, associated himself with the President's remarks, and said that the subject of the paper was one of great interest to those members who practised that part of the profession. There was a difference, and always had been a difference, between bills of quantities for the engineers' and contractors' business and the architects' and builders' business. He had been largely connected with both, and he had found no difficulty in making the necessary differences, and he had not had any complaint of want of uniformity. He thought the same remarks would apply to what might be called the London system and the Midland and North Country system—that was for architects', not contractors', works. If there had been any strong desire on the part of the builders of England for a uniform system they would have heard of it—from the Master Builders' Association or from some other body—and if such a desire existed he would be one to attempt to meet such views. As surveyors, it was not for them to take the initiative. Mr. Leaning seemed to have suffered somewhat from what he called the preternatural sharpening of the wits of builders' estimating clerks and the extraordinary claims made by builders' clerks, who alleged imperfect descriptions. In his experience there were good and bad amongst such a large body as the builders' estimating clerks, and he had known, and did know, some estimating clerks for whom he had the greatest respect, and whom he should be more inclined to call surveyors than estimating clerks, and whom he would be glad to see members of the Institution if there were any means of admitting them. At the same time there were many others of the class at whose hands Mr. Leaning had no doubt suffered; but in his experience the ways and manners of these gentlemen were very much the same now as they were fifty years ago. No doubt accuracy and comprehensiveness of description in bills of quantities were the best means of preventing such claims. It was impossible to deal with all the different points made by Mr. Leaning, but he would refer to a few. As to the practice of making material pay for labour, he did not think that any of them would argue that that was a right principle, and as to the question of measuring by the superficial yard or superficial foot, he did not think it was of very much moment. It could not make much appreciable difference, but if the builders wished them to adopt the superficial yard or any other means, he should be glad to do so. As to the measurement of labour to openings, etc., the only argument in favour of not doing so was that it was not customary. He did not think it would be an unreasonable thing to do. Mr. Steward referred to other points in the paper, and in the course of his remarks he said it was not for a surveyor, in taking out quantities, to take any responsibility upon himself more than that which he was obliged to do in order to translate the drawings and specification into bills of quantities for the builder. If there was any liability, the extent of which was unknown, it was for the surveyor to express it in words, and if the builder liked to speculate in the matter he was entitled to do so. The same remarks would apply to taking. As to making the price for masonry to include plain beds and joints and preliminary facing, he had set his face against it all his life, and he could give good reasons for doing so He had devoted a good deal of time in studying Mr. Leaning's comparative statement showing the variations in the methods of measurement, and anyone taking interest in the matter could not do better than do the same. It could be seen at the Institution premises.

Mr. Howard Chatfeild Clarke, in seconding the vote of thanks, said that the paper had helped them in many ways. It was not an architect's business to interfere in the matter of quantities, and he did not do it himself, and it was not a quantity surveyor's province to become an architect; there was room for both. He never made quantities part of the contract, but he made the drawings and specification connected with the contract. As to extras, on the minutest detail there were often claims for extras, and on some jobs quantities were taken floor by floor, and that was a good system both to builders and employers. He was glad that the paper had been read, as there was an idea about that the Institution had not done as much for quantity surveyors as it could; but he did not admit that.

Mr. E. J. Burr said that more progress had been made in the matter of uniformity of contract than some people realised. He knew north-country contractors who told him that the sets of quantities they liked were sets of London quantities. It was not necessary to level down to the north-country practice, which was not so good as the London practice, and if they adhered to the London practice they would convert the whole country to it. But it was a doubtful advantage to have a very close uniformity of practice; a little individuality was wanted. They did not want to be measuring machines, and they wanted to use their brains for the good of the profession. They wanted uniformity in essentials, and not in unessentials.

Mr. A. J. Gate said that the paper they had listened to was an excellent one, and in common with everyone else he was sorry the author had passed away. The paper was carefully thought out, and was by a man who knew what he was writing about, and he (the speaker) agreed with all of it. In the *Builder* for April 22, 1905, appeared a report of a meeting of the Quantity Surveyors' Association, at which Mr. A. G. Cross read a paper relating to matters affecting quantity surveyors, and at that meeting he (the speaker) made some remarks which might very well be read in connexion with Mr. Leaning's paper. Mr. Gate then read our report of his remarks on the occasion referred to. Proceeding, he said that what he said then he said now. Mr. Leaning's paper began at the wrong end; assimilation must be led up to by a reform of our London system. As an illustration of how the London system varied, he could refer to what Mr. Steward said was his practice in London after fifty years' experience. Mr. Steward said it was not the duty of the surveyor to save the builder from risk—that the builder must take all risks, but he (the speaker), with about forty years' experience, did not believe in that at all. He found out what a risky piece of work would cost, and he put in a money provision for the amount. In London there was no recognised and followed system of measurement, and that was a disgraceful fact. Forty years ago there was, and it was a good and thorough system, and it was followed by the best men of the profession. London surveyors generally were then brought up in that system, the money premium to learn which was from 200 to 300 guineas, and unless a young man had been fairly well educated no surveyor would take him into his office at all; but once in the office they were taught the system thoroughly. He need not tell them how and where, nowadays, most quantity surveyors came from and how they got into the profession. They did not learn their profession; they picked it up from text-books, some of which had better never have been written. Who was to blame, and how was that state of affairs to be remedied? If they were going to assimilate they must level upwards. For thirty-five years that Institution had been the examining body in England for surveyors, and during that time it had passed into its ranks hundreds, he might say thousands, of surveyors, some by examination, some not, and until the last two years there had been no other body for quantity surveyors at all. Two years ago the Quantity Surveyors' Association was established, and since that time quantities had received more attention in the Institution.

The Chairman said he must ask Mr. Gate to keep to the subject of the paper. They would not discuss the education of the quantity surveyor.

Mr. Gate said he could not properly discuss the subject without doing that. The Institution being the examining body, they must be held responsible, to some extent, for the present state of affairs. If they were to have a London system of quantities, where were they to look for it if not to the members of the Institution, and if their mode of doing work was not the London system, where was it to be found? Mr. Gate then gave instances of the system of some London quantity surveyors, and said he was not prepared to follow that way, and until these abuses were remedied they must not talk to the provinces about assimilation: they must work for an assimilation at home. The Institution was faced by four alternatives:—(1) Either the surveyors of the present day had not found the examinations good enough to prove them competent, and a large number of the members were not competent when they passed the examination, (2) or they had been passed into the Institution without examination although incompetent, and could not have passed a proper examination, (3) or, having the knowledge and being competent, and having passed a proper examination, they were yet scamping their work by underselling the profession, and taking work at prices which made it impossible for them to do it properly at the price. The fourth alternative was even worse, and it was that there were men with F.S.I. after their names—which letters induced the innocent public to think those men were thoroughly competent—using those letters to obtain work which they did not do themselves but farmed out to incompetent men—a disgraceful system of sweating. Therefore, assimilation must begin by putting the London practice in order, and when the Institution moved in the matter they would find a useful ally in the Quantity Surveyors' Association.

Mr. C. J. Mann said it was desirable, if possible, to get uniformity, but it would be difficult to get it, and it would lead to a great deal of trouble in those cases where it would be necessary to lay alterations in their system before the builders. He thought the London methods were far more precise and suitable and satisfactory than the provincial methods; therefore, he should say that it would be for the provinces to assimilate their method to the London one rather than that the London system should be assimilated to the provincial one. He should be pleased to join with others in discussing some alteration in that direction. They should look forward to the gradual survival of the fittest in the matter.

Mr. G. Corderoy said he thought that text-books had their uses, though it was a mistake to depend entirely upon them. As to the abused examination, he should like to say a word for it. It could not be regarded as a substitute for office training, but a stimulus, and a valuable stimulus, to students properly trained. They could not keep out the man who was crammed, and that was the difficulty of all professional examinations. It was not likely that in a large profession like theirs all would be of equal ability and standing, but the great thing the Institution had to do was to look after character, and it was character which was the great safeguard for good and honest work. He did not think uniformity was of much importance, and they should suit themselves as far as possible to the locality where the bill of quantities was to be used. If they could adopt the metric system in connexion with quantities he thought it would be a great advantage, and the Institution would confer a blessing upon them if it could get the metric system adopted. The varieties of work were so great that to attempt a uniform standardisation, or to write a standard bill of quantities, was beyond the powers of one man or a body of

men; the document would require skilled interpretation, and would lead to many arbitrations. He differed altogether as to one part of the paper—*i.e.*, the suggestion that the method of measurement should follow the practice of the merchants. Surveyors' methods of measurements had no reference to that at all, and all they were concerned with was the material after it left the merchant's hands and had got into the hands of the contractor.

The vote of thanks was then put to the meeting and heartily agreed to.

Mr Leaning, in reply, said he would deal with the points raised in the discussion in a written communication.

It was announced that the next meeting will be held on March 12, when Mr. W. Woodward will read a paper on "The Means of Locomotion and Transport in London"—a paper on the Report of the Royal Commission on London Traffic.

The meeting then terminated.

---

The following is Mr. Leaning's written reply as communicated to the Secretary of the Institution:—

"I gladly accept the opportunity offered by the President of replying to the points raised in the discussion on my father's paper, and need hardly say in doing so how much I appreciated the kind things that were said about him.

With all deference to those older members of the profession who spoke, I cannot help expressing my great surprise at their attitude on this question. Although this subject has been mooted for so long, there has never before been a discussion in this Institution on the subject. Now that we have had one it is clear that no progress is likely to be made towards the objects for which my father contended in his paper until the need for the reform is more generally felt.

The principal objections made are as follows:—

"1. That if it were necessary, the builders would have long ago agitated for it.

2. That it would result in a sacrifice of individuality on the part of members of the profession.

3. That it is impossible to produce a standard code of measurement."

In reply to the first objection the London builders would be hardly likely to concern themselves in the matter so long as there was reasonable uniformity in the London method. The chief difficulties which arise through the want of uniformity occur when London bills are circulated in the provinces and *vice-versâ*. I know an authentic case where a bill of stonework according to the London system was returned by the Yorkshire masons as being quite incomprehensible to them, and the whole of the work had to be done again according to the local custom.

Want of co-operation between the master builders seems hardly a sufficient reason for persistence in the chaotic methods now prevailing. After all, the builders themselves, not being surveyors, cannot dictate to us, and as they probably profit quite as much as they are inconvenienced by it they are quite content to look on and wonder what it all means. The men who would be most likely to agitate are the builders' surveyors, whom Mr. Steward so justly commended, but who, as he stated, have little or no voice in the affairs of surveyors as a body. The fact that four provincial societies should have found it necessary to make the attempt is a strong argument in favour of such a course, and I think it is only because London is so heterogeneous that nothing has been done there.

The second objection is a very English one, and reminds one of the case of the farmers, among whom for this same reason co-operation of any kind has entirely failed. However pleasurable the exercise of one's individuality may be, this seems hardly the place for it, and it is surely a more praiseworthy thing to sacrifice one's peculiarities, when they can be shown to be such, for the sake of the general good.

If the replies to these two objections are valid the third objection should not stand in the way, for it seems to me merely a question of determination and work. When one sees what has been done in this direction in France, as in the Série-des-Prix of the various municipalities, I think it is mere confession of weakness to say that it is impossible to standardise our work. I entirely agree with Mr. Gate that the differences in practice in the London system must be settled before anything can be done. A few of these were presented by Mr. Alfred Roods in Volume IX. of the "Notes," page 156, and they might be very usefully extended to the other trades, when I am sure the necessity for a London code would be evident to everybody, and I feel that if such a code is not taken in hand by our Standing Committee at an early date it will be done by some other body, and that, I think, will be a slur upon this Institution.

Until we ourselves agree it seems futile to expect to agree with our provincial fellows, but with such a code as is now suggested London surveyors would be fully prepared for a conference with the provincial societies.

The Institution has recently expressed itself anxious to advance the interests of quantity surveyors, and I venture to suggest that some report on this question might be issued by the Committee at an early date, as I feel convinced that the feeling in favour of such a movement is much more general than the discussion might lead one to suppose."

---

## THE APPOINTMENT OF DISTRICT SURVEYORS.

On this subject the council of the Institute of Architects have addressed the following letter to the London County Council:—

"9, Conduit-street,
February 23, 1906.

To the Chairman and Members of the London County Council.

My Lords and Gentlemen,—

The attention of the council of this Institute has been directed to the question of certain changes which are in contemplation by the London County Council with regard to the terms of appointment of district surveyors under the London Building Act.

From the report of the proceedings of the London County Council published in the public press it appears that the original proposal of the Building Act Committee involved, *inter alia*, a reduction in the number of surveyors and the substitution of fixed salaries in lieu of fees.

This proposal, it would appear, did not meet with general approval, and the matter was accordingly referred back.

As the subject is one of considerable importance not only to the architectural profession, but also to London generally as a city and community, the council of this Institute, having given the matter their careful attention, desire me to place before the members of your honourable Council certain views which appear to them worthy of consideration.

As you are probably aware, the Legislature, in dealing with the building laws of the metropolis, has by a long series of enactments extending from the time of Charles II. deliberately and uniformly provided that the administration of those laws should be in the hands of trained and experienced professional men, who in the pursuit of their craft as architects have acquired practical knowledge of the various changing problems which arise in designing and adapting buildings to the manifold conditions which have to be met in a city of such vast size and importance as London, especially in the more central and congested districts devoted to mercantile purposes, upon which its prosperity so largely depends.

Under such supervision was London rebuilt after the Great Fire; under such supervision has London grown and developed; and under such supervision is a large proportion of the building work of the metropolis carried out at the present time.

The council need hardly dwell on the importance which this Institute attaches to the preservation of this system, and the advantages which accrue to members of the profession in having the advice and co-operation of a colleague trained in his art and with a full knowledge of the statutes relating to it.

Such co-operation has worked well in the past, and in the opinion of this Institute to the advantage of the owners and occupiers of every class of buildings in London.

It is therefore with a full sense of responsibility that the council of this Institute would urge upon the London County Council the desirability of preserving in its integrity a system which has obtained and endured through many reigns with the full sanction and authority of Parliament.

To this end they would suggest that the disability which has been imposed in the case of some of the later appointments should no longer be enforced, and that in future all surveyors acting under the provisions of the London Building Act should be practising architects.

I have the honour to be,
My Lords and Gentlemen,
Your most obedient servant,
W. J. Locke, Secretary."

---

# Illustrations.

## THE QUEEN VICTORIA MEMORIAL, LIVERPOOL.

THE Queen Victoria Memorial in Liverpool, which we illustrate to-day, stands at the junction of Lord-street, Castle-street, and James-street in that city.

Its general plan, as will be seen, is circular, with four semi-circular bays and four flights of steps. These steps lead to a circular platform, around which are four groups representing Education, Commerce, Agriculture, and Manufacture; and in the centre is a dome supported by sixteen Ionic columns. On the dome itself stands the figure of Fame. Round the base of this dome are four figures representing Justice, Peace, Charity, and Wisdom. Beneath the dome stands the statue of the late Queen, under a flat-domed ceiling of plain gold mosaic.

The whole of the masonry has been carried out in Portland stone by Messrs. W. Thornton & Sons under the direction of the architects, Professor Simpson and Messrs. Willink & Thicknesse. The sculpture, which is in bronze, is by Mr. C. J. Allen. The figures on the dome have been cast by Mr. A. B. Burton, of Thames Ditton; the central statue and the remaining groups by Messrs. J. W. Singer & Co., of Frome, and the lead vases, measuring 2 ft. 8 in. in diameter, have been made by Messrs. Thomas Elsley.

The outer diameter of the circle is 113 ft., including pavement, and the height to the top of the wings of Fame 64 ft. The statue of the Queen is 14 ft. 6 in. high.

---

## DESIGN FOR A SKEW BRIDGE.

THIS is the design which gained for its author, Mr. George Nott, of Leicester, the Grissell Medal of the Institute of Architects this year.

The Grissell prize consists of a gold medal and ten guineas, and we believe we are correct in saying that it was founded specially to promote the study of construction, though we observe that the Institute Calendar contains no statement on this point; mention is made of the objects of several other prizes, but not of the object of this one. It would be better if a word or two were inserted on this point in future issues of the Calendar.

Mr. Nott's design was unquestionably the best of those submitted, especially in regard to the fact that it combines good architectural design with constructional study.

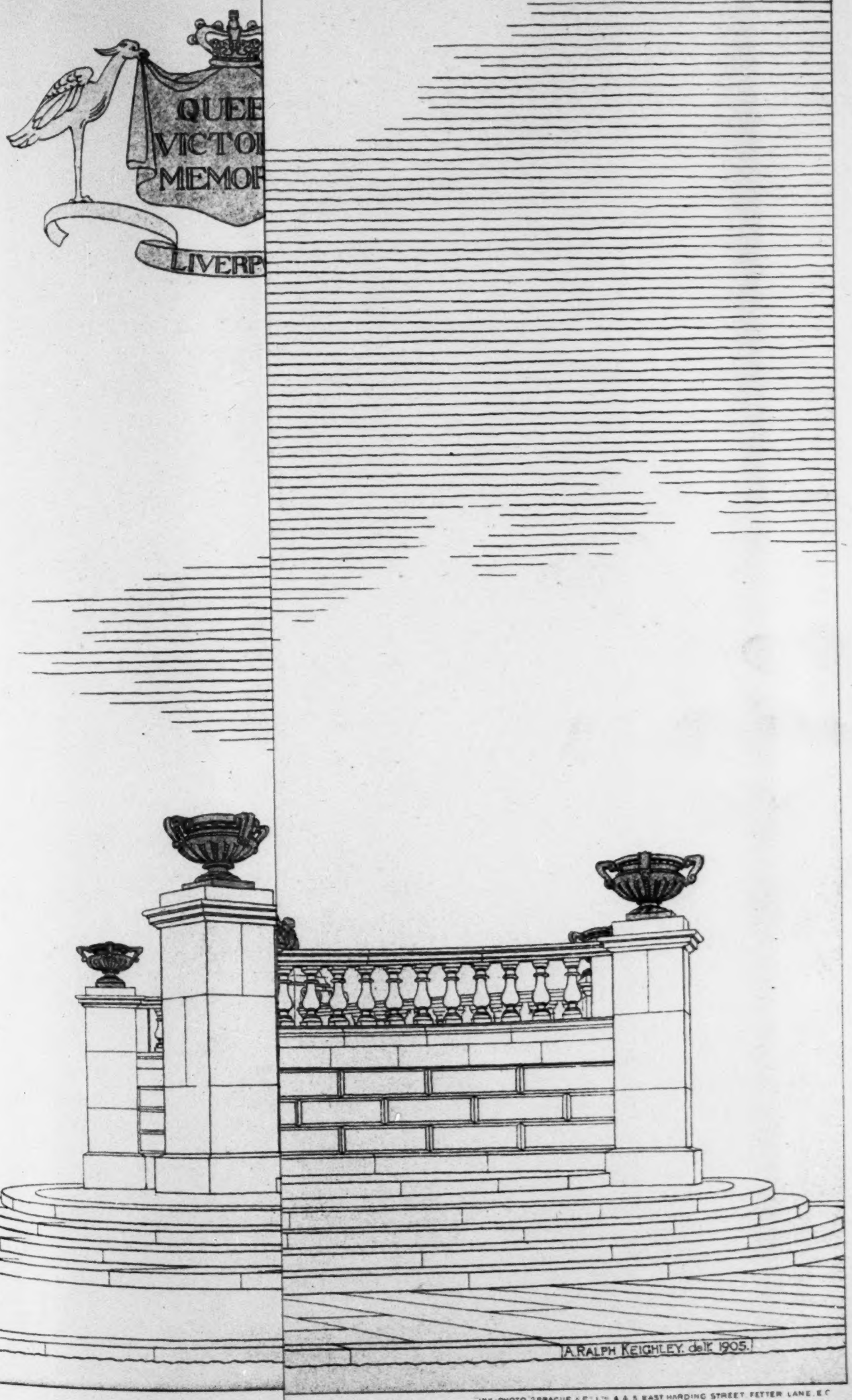
The author sends us the following notes in reference to his design:—

"The conditions of this competition leaving one an almost entirely free hand, my aim was to produce a scheme which should be quite simple and yet monumental in character.

The approaches seemed to demand almost as much consideration as the appearance from the river, and by placing the pavilions at right angles to the axis of road the chief architectural difficulty was overcome, the inequality of distance between the pavilions and pylons on either side being more or less unnoticeable both from the river and the approaches.

No great difficulty presented itself constructionally, with the exception of the determination of the external loading. The latest available information regarding the weight of a crowd was taken as the data for the first test, and that of modern haulage traffic for the second, the latter being a severe one.

It may be noted that, following the practice of some of our best bridge engineers, nothing was added to the actual dead weights of the above loads as an allowance for


QUEE
VICTO
MEMO
LIVERP
A. RALPH KEIGHLEY. delt. 1905.
INK-PHOTO SPRAGUE & C° LT° 4 & 5 EAST HARDING STREET FETTER LANE E.C.

Institute would urge upon the London County Council the desirability of preserving in its integrity a system which has obtained and endured through many reigns with the full sanction and authority of Parliament.

To this end they would suggest that the disability which has been imposed in the case of some of the later appointments should no longer be enforced, and that in future all surveyors acting under the provisions of the London Building Act should be practising architects.

I have the honour to be,
My Lords and Gentlemen,
Your most obedient servant,
W. J. LOCKE, Secretary."

## Illustrations.

### THE QUEEN VICTORIA MEMORIAL, LIVERPOOL.

THE Queen Victoria Memorial in Liverpool, which we illustrate to-day, stands at the junction of Lord-street, Castle-street, and James-street in that city.

Its general plan, as will be seen, is circular, with four semi-circular bays and four flights of steps. These steps lead to a circular platform, around which are four groups representing Education, Commerce, Agriculture, and Manufacture; and in the centre is a dome supported by sixteen Ionic columns. On the dome itself stands the figure of Fame. Round the base of this dome are four figures representing Justice, Peace, Charity, and Wisdom. Beneath the dome stands the statue of the late Queen, under a flat-domed ceiling of plain gold mosaic.

The whole of the masonry has been carried out in Portland stone by Messrs. W. Thornton & Sons under the direction of the architects, Professor Simpson and Messrs. Willink & Thicknesse. The sculpture, which is in bronze, is by Mr. C. J. Allen. The figures on the dome have been cast by Mr. A. B. Burton, of Thames Ditton; the central statue and the remaining groups by Messrs. J. W. Singer & Co., of Frome, and the lead vases, measuring 2 ft. 8 in. in diameter, have been made by Messrs. Thomas Elsley.

The outer diameter of the circle is 113 ft., including pavement, and the height to the top of the wings of Fame 64 ft. The statue of the Queen is 14 ft. 6 in. high.

### DESIGN FOR A SKEW BRIDGE.

THIS is the design which gained for its author, Mr. George Nott, of Leicester, the Grissell Medal of the Institute of Architects this year.

The Grissell prize consists of a gold medal and ten guineas, and we believe we are correct in saying that it was founded specially to promote the study of construction, though we observe that the Institute Calendar contains no statement on this point; mention is made of the objects of several other prizes, but not of the object of this one. It would be better if a word or two were inserted on this point in future issues of the Calendar.

Mr. Nott's design was unquestionably the best of those submitted, especially in regard to the fact that it combines good architectural design with constructional study.

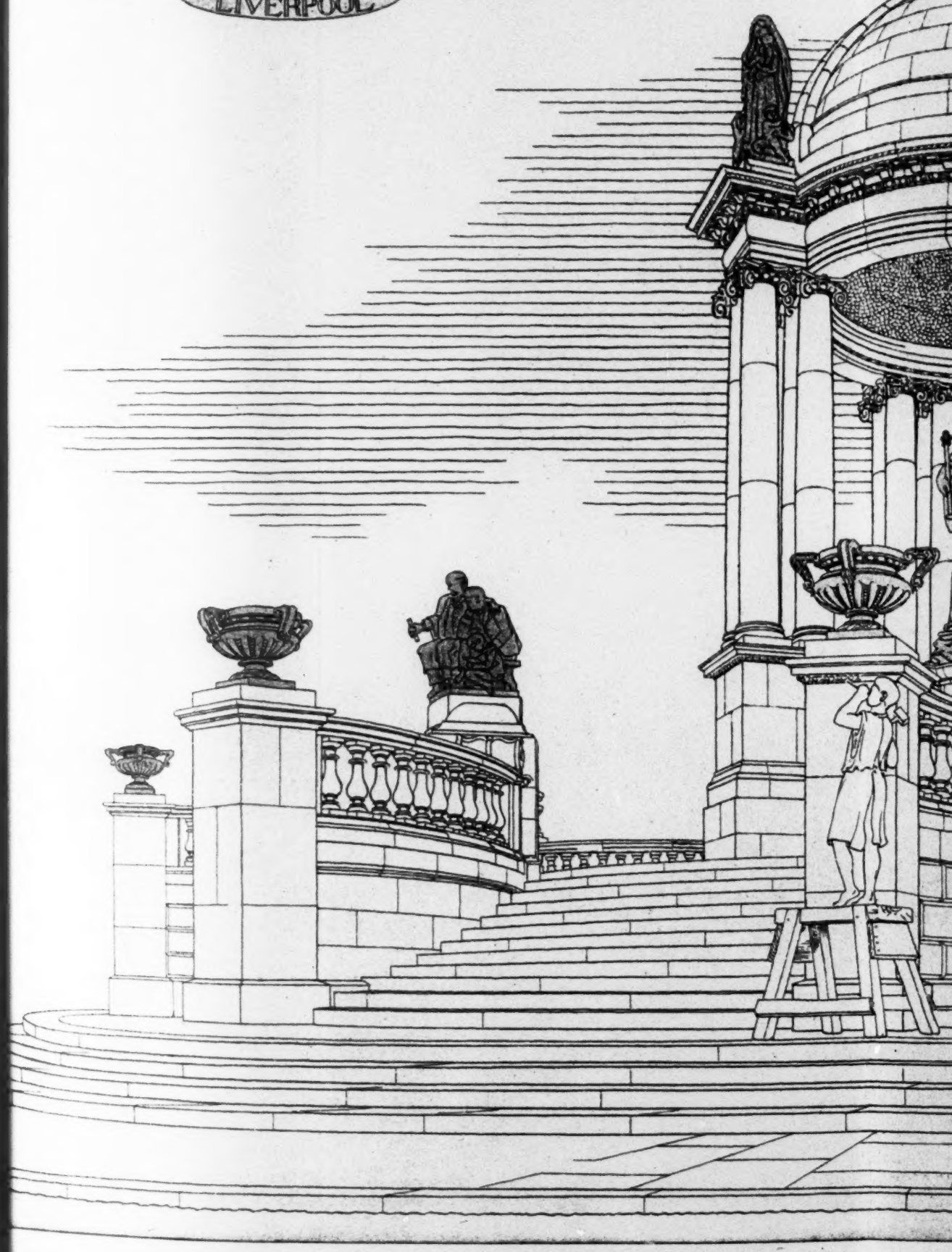
The author sends us the following notes in reference to his design :—

"The conditions of this competition leaving one an almost entirely free hand, my aim was to produce a scheme which should be quite simple and yet monumental in character.

The approaches seemed to demand almost as much consideration as the appearance from the river, and by placing the pavilions at right angles to the axis of road the chief architectural difficulty was overcome, the inequality of distance between the pavilions and pylons on either side being more or less unnoticeable both from the river and the approaches.

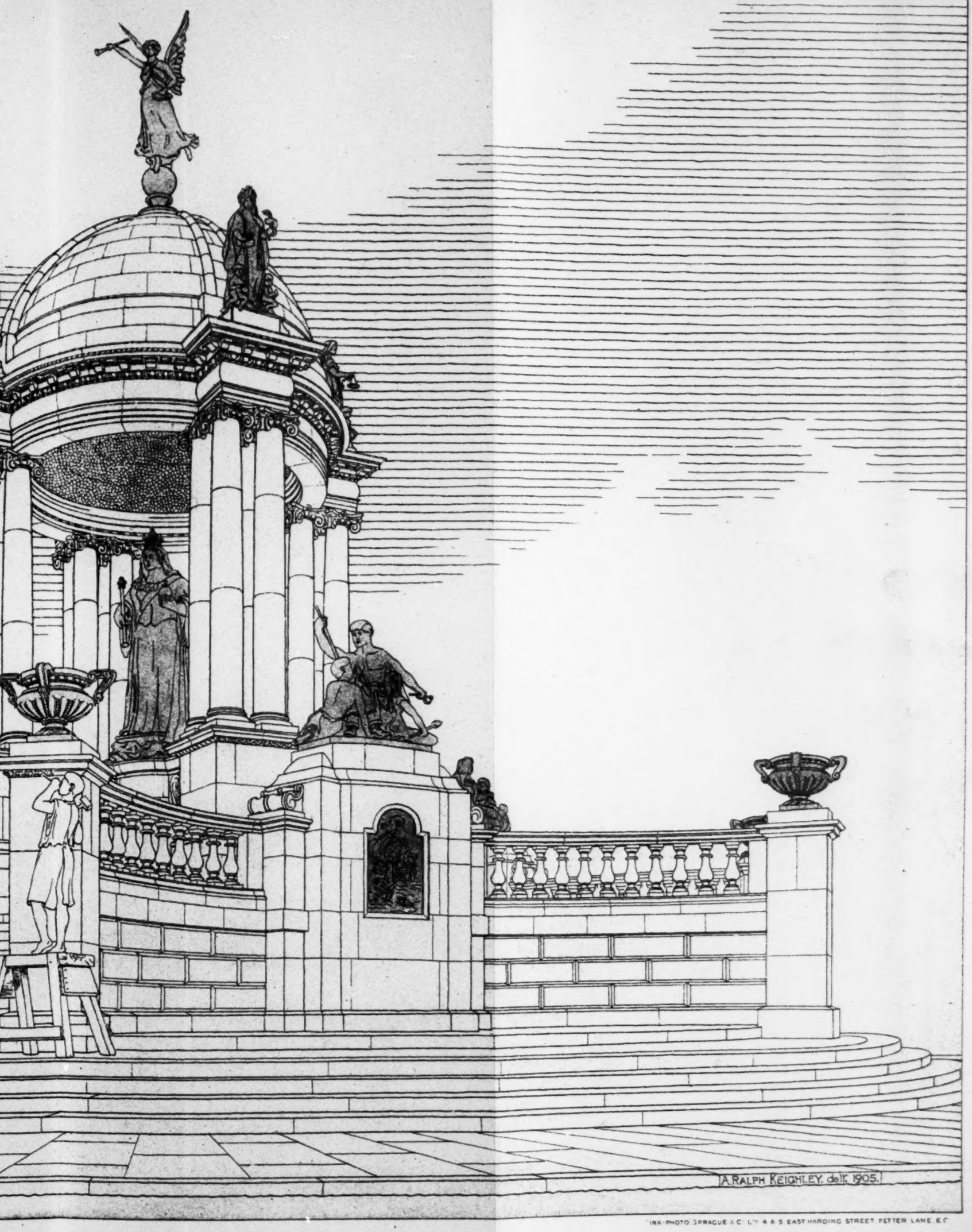
No great difficulty presented itself constructionally, with the exception of the determination of the external loading. The latest available information regarding the weight of a crowd was taken as the data for the first test, and that of modern haulage traffic for the second, the latter being a severe one.

It may be noted that, following the practice of some of our best bridge engineers, nothing was added to the actual dead weights of the above loads as an allowance for



THE QUEEN VICT

PROFESSOR SIMPSON AND MESSRS. WILLINK &

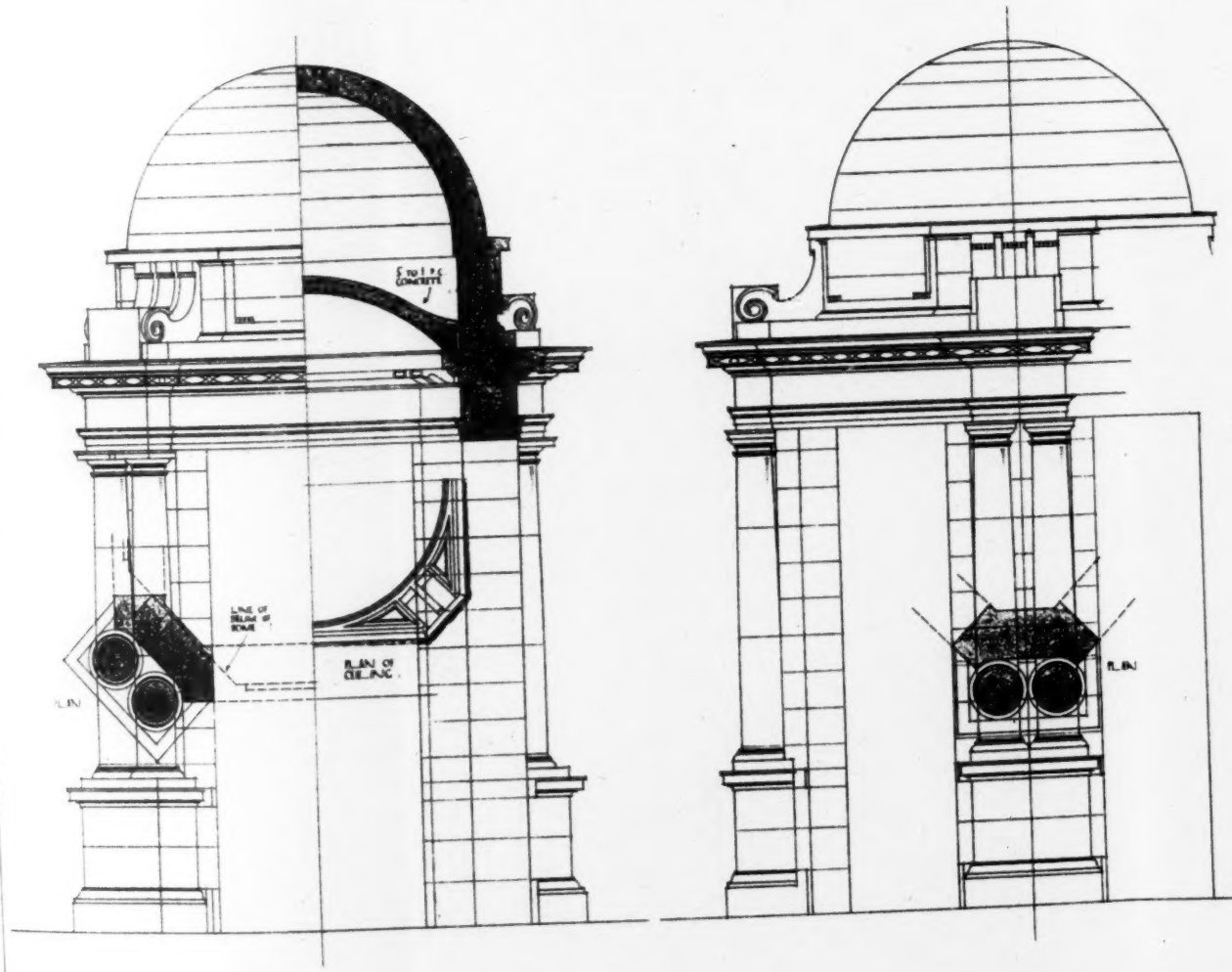



INK-PHOTO SPRAGUE & C° L^TD 4 & 5 EAST HARDING STREET FETTER LANE E.C.

THE QUEEN VICTORIA MEMORIAL, LIVERPOOL.

ND MESSRS. WILLINK & THICKNESSE, ARCHITECTS: MR. C. J. ALLEN, SCULPTOR.

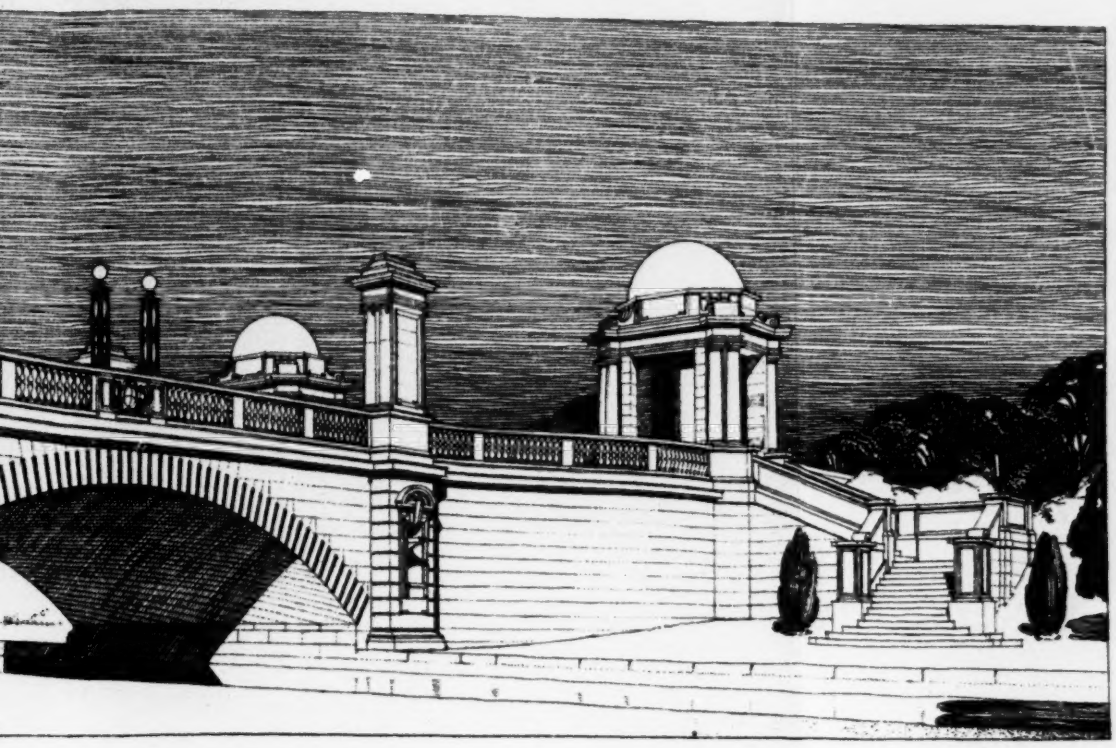
# DESIGN FOR A STONE SKEW BRIDGE

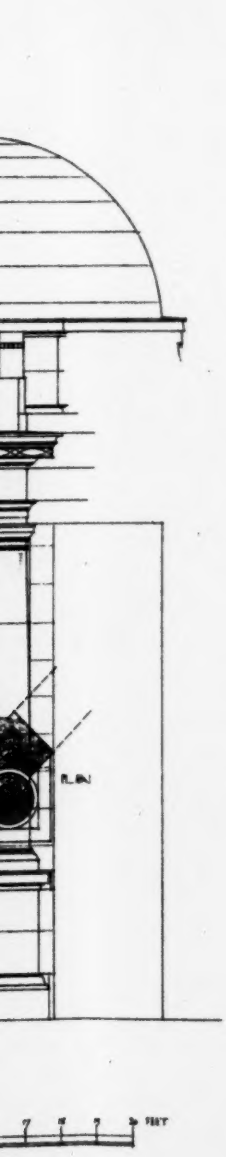


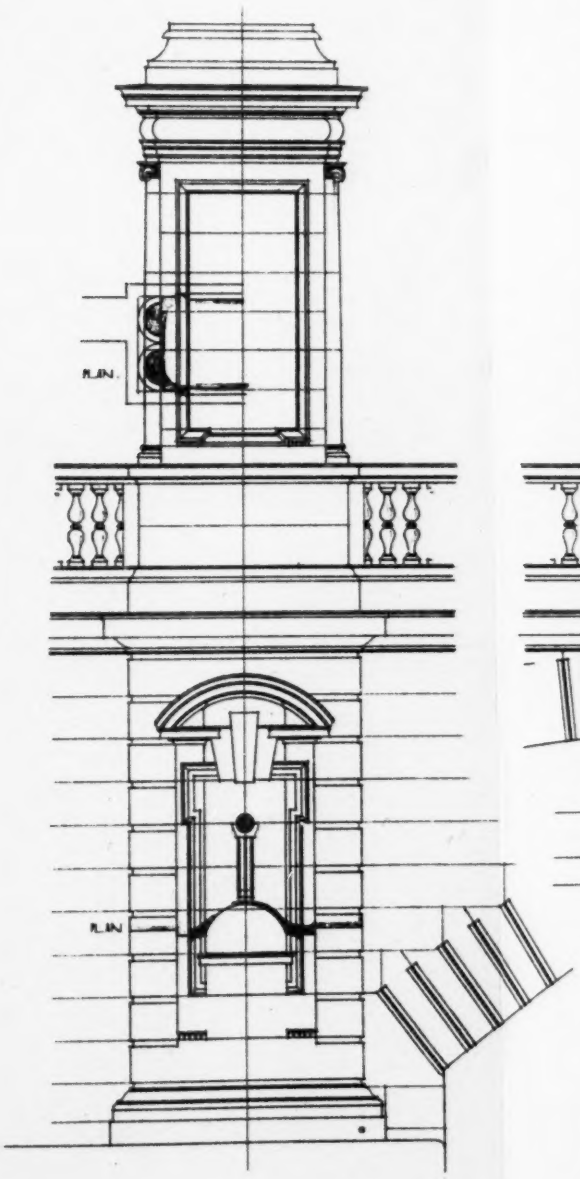
DETAILS OF PAVILIONS.

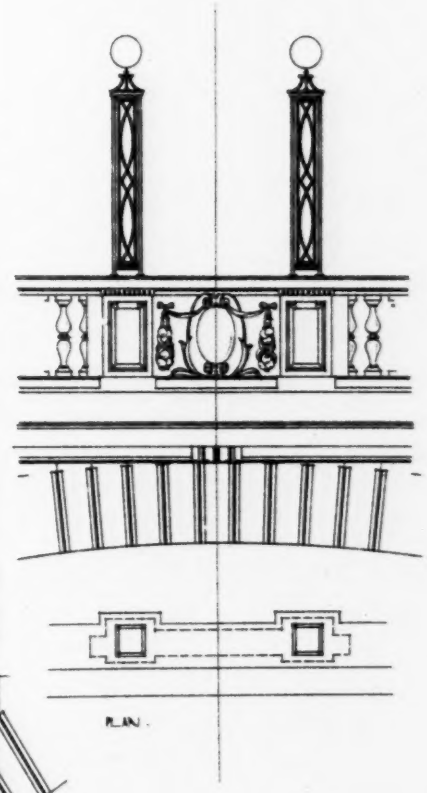
DESIGNED BY MR. G. NOTT.

*Grissell Medal, R.I.B.A., 1906.*

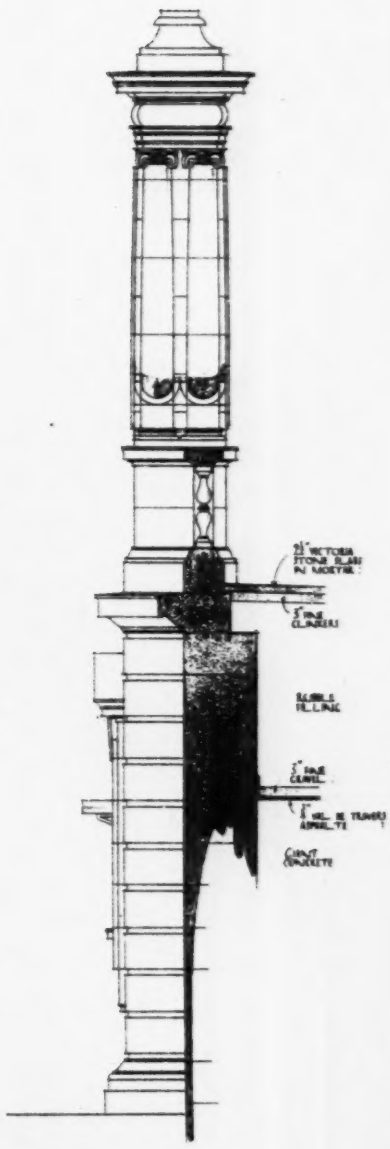








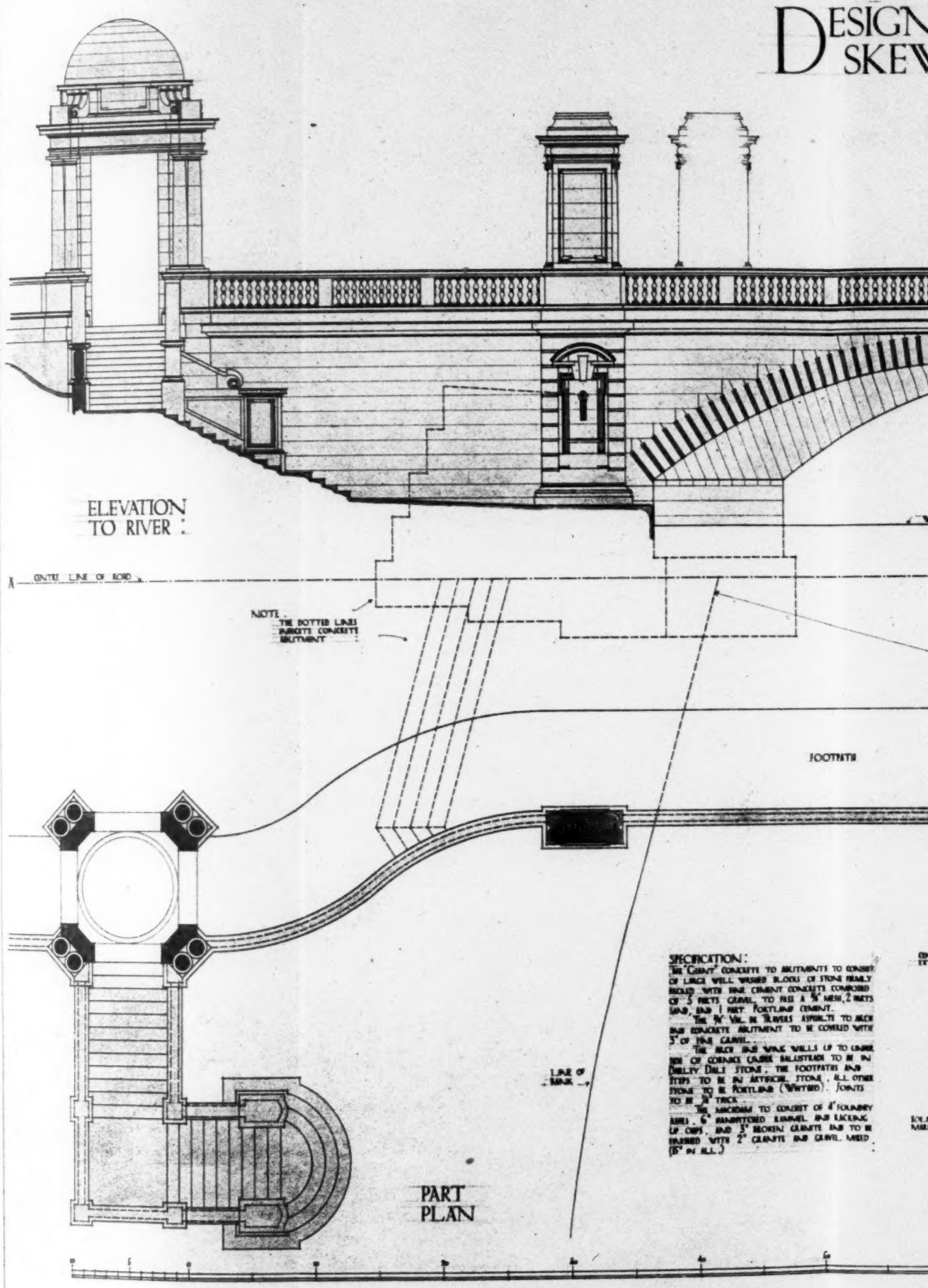
DETAILS OF PIERS AND ARCH :



# UTILE DULCI.

PHOTO LITHO SPRAGUE & C° LT° 4 & 5 EAST HARDING STREET FETTER LANE, E.C.

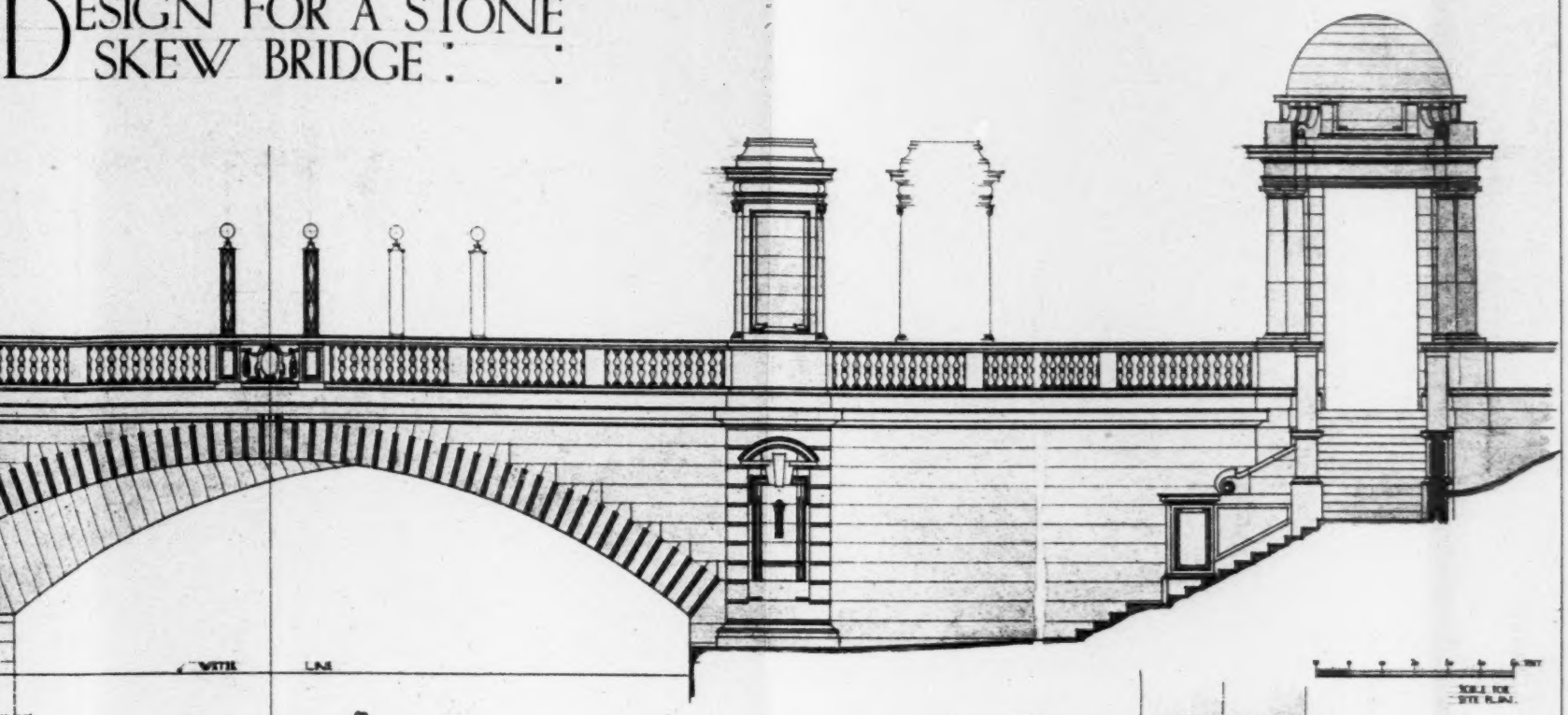
# DESIGN
# SKEW

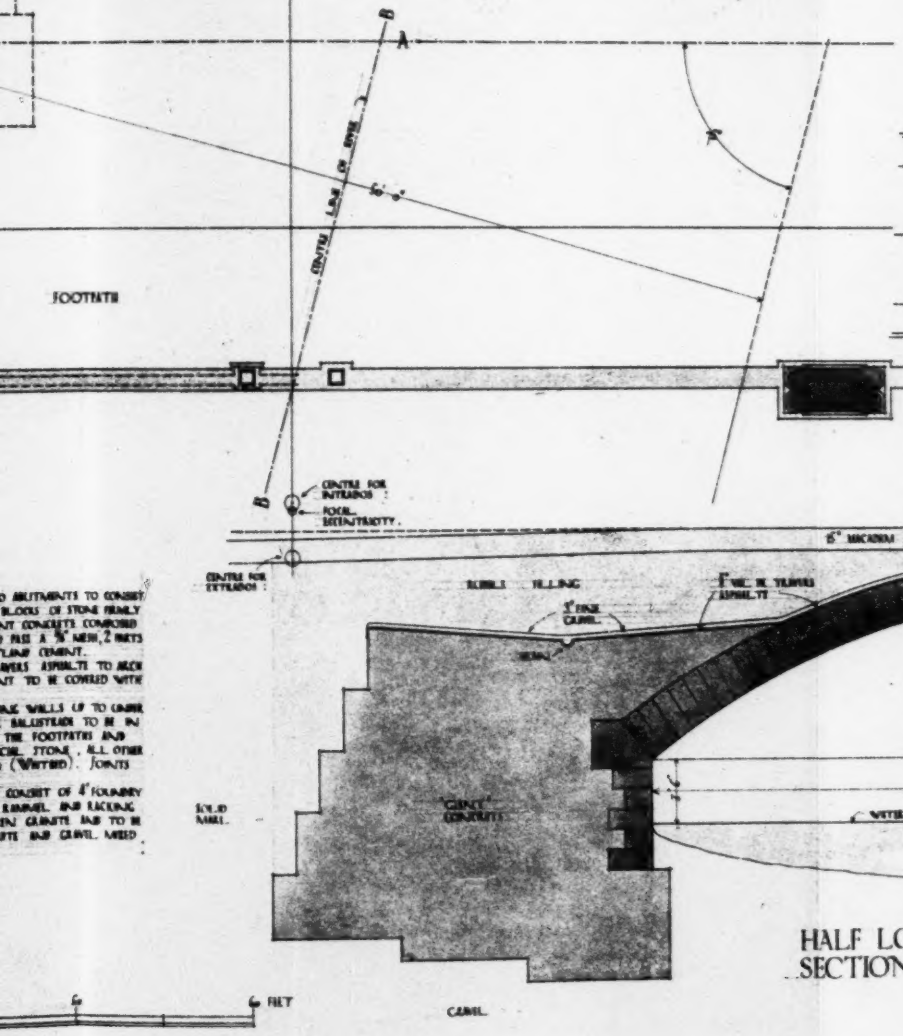


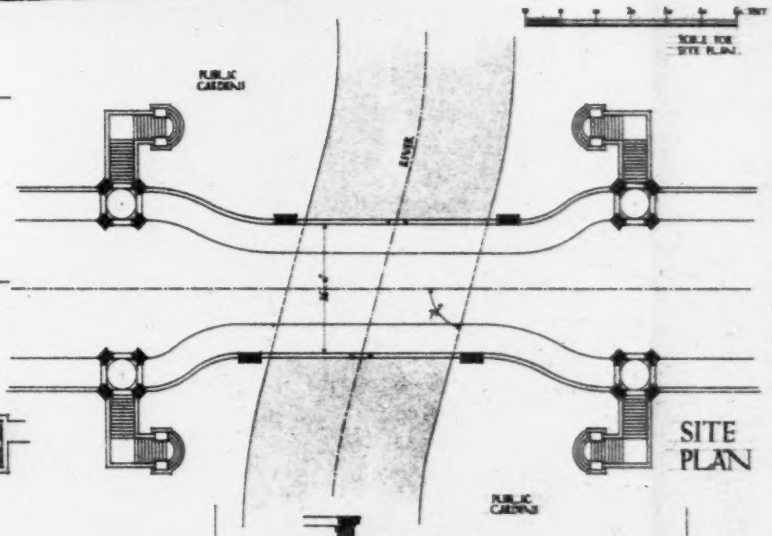

DESIGNED BY MR. G. NOTT.

*Grissell Medal, R.I.B.A., 1906.*

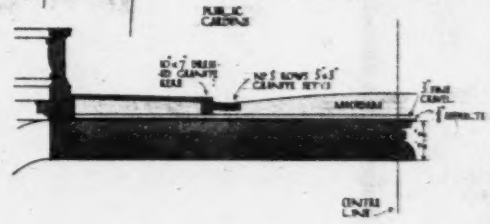
# DESIGN FOR A STONE SKEW BRIDGE.






SITE PLAN



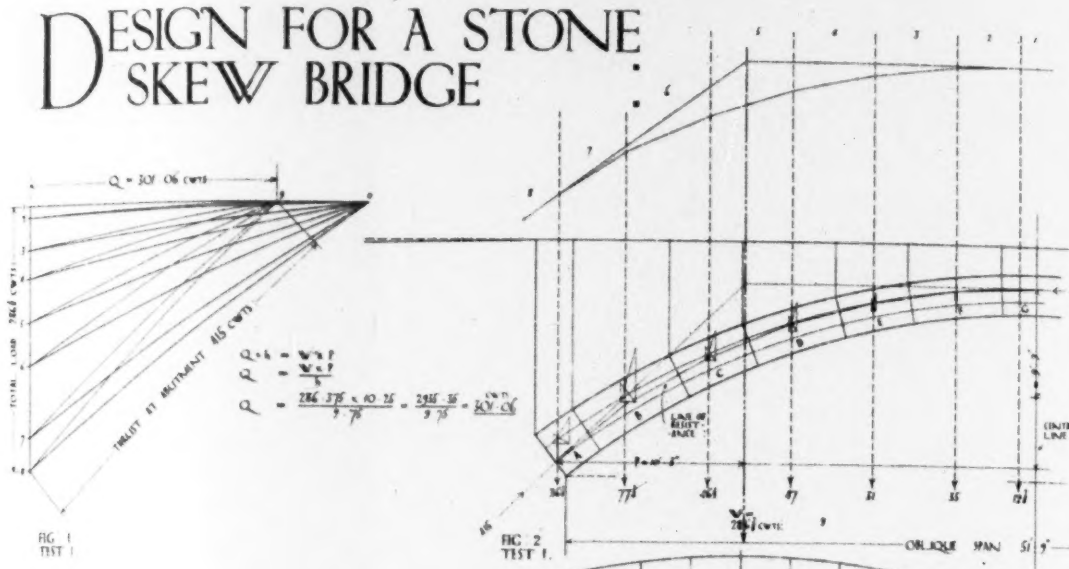

HALF LONGITUDINAL SECTION ON LINE A A

HALF CROSS SECTION ON LINE B B

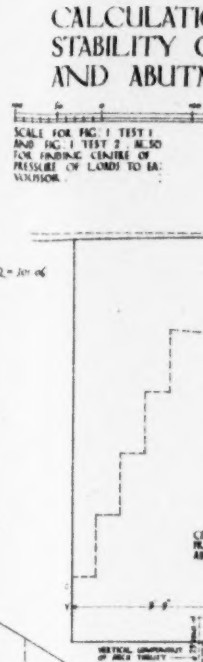
UTILE DULCI.

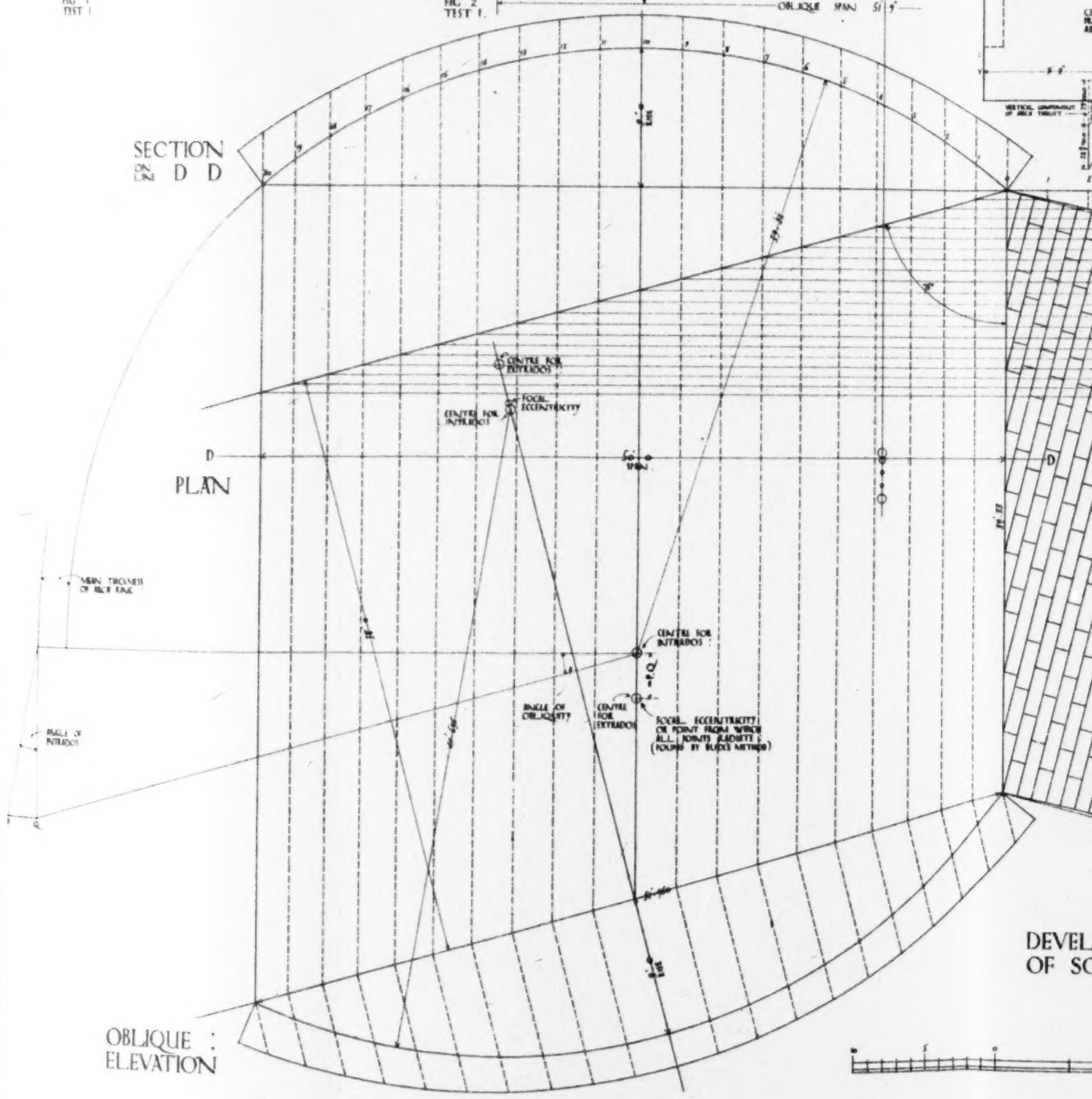
INK PHOTO. SPRAGUE & C° L^D 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

# DESIGN FOR A STONE SKEW BRIDGE




CALCULATIO
STABILITY O
AND ABUTM






DEVEL
OF SC

DESIGNED BY MR. G. NOTT.

*Grissell Medal, R.I.B.A., 1906.*

# CALCULATIONS FOR STABILITY OF ARCH AND ABUTMENTS :

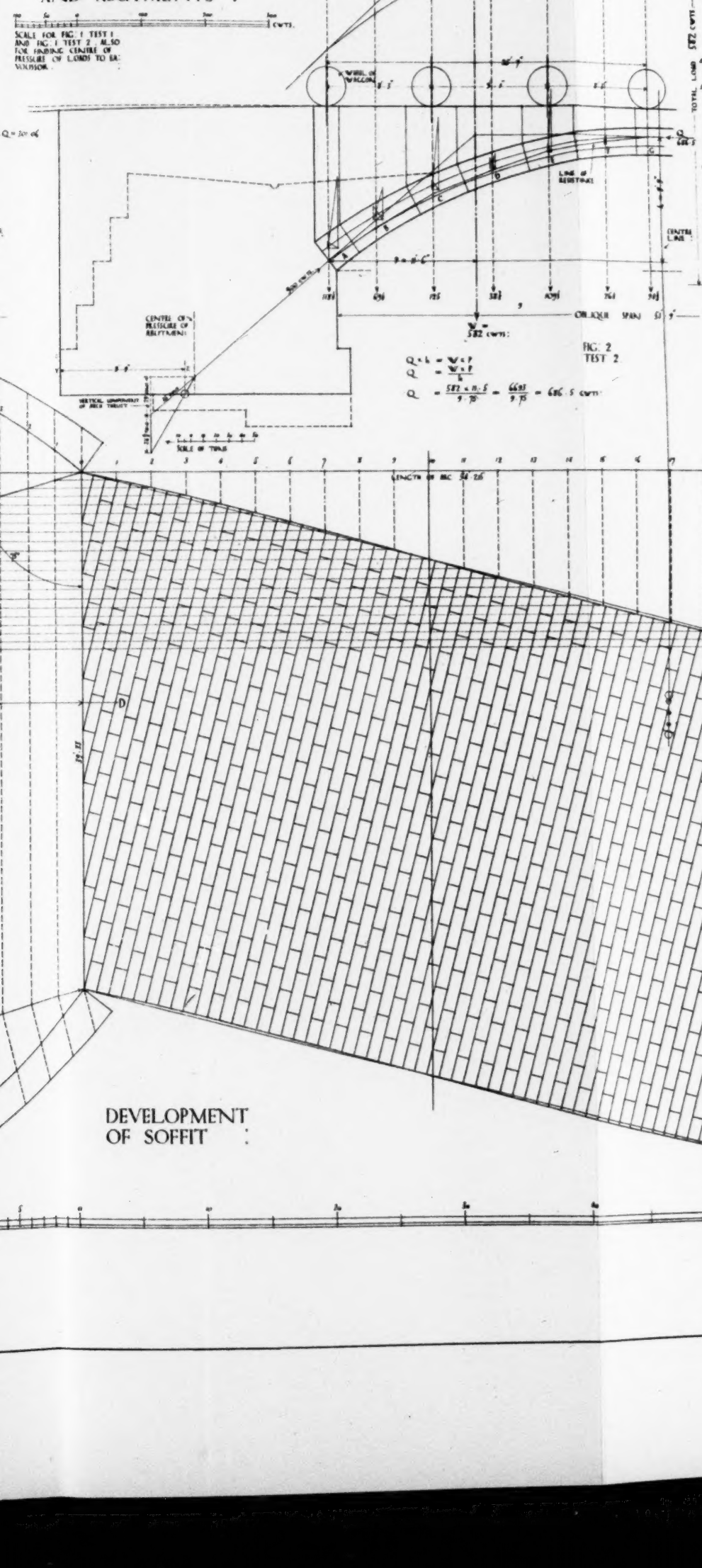

SCALE FOR FIG. 1 TEST 1 AND FIG. 1 TEST 2. ALSO FOR FINDING CENTRE OF PRESSURE OF LOADS TO EA: VOUSSOIR.
CWTS.
WHEEL OF WAGGON
LINE OF RESISTANCE
CENTRE LINE
CENTRE OF PRESSURE OF ABUTMENT
VERTICAL COMPONENT OF THRUST
SCALE OF TONS
OBLIQUE SPAN 51' 5"
LENGTH OF ARC 84' 2.6"
DEVELOPMENT OF SOFFIT :
FEET.

FIG. 2
TEST 2

$$Q \times h = W \times p$$
$$Q = \frac{W \times p}{h}$$
$$Q = \frac{582 \times 8.5}{9.75} = \frac{6651}{9.75} = 686.5 \text{ cwts}$$

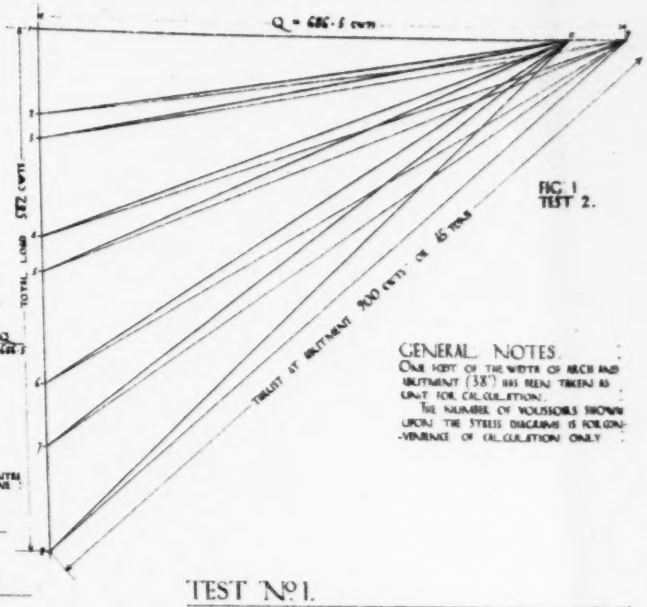



FIG. 1
TEST 2.

## GENERAL NOTES.

ONE FOOT OF THE WIDTH OF ARCH AND ABUTMENT (38") HAS BEEN TAKEN AS UNIT FOR CALCULATION.

THE NUMBER OF VOUSSOIRS SHOWN UPON THE STRESS DIAGRAMS IS FOR CONVENIENCE OF CALCULATION ONLY.

## TEST No. 1.

DATA & TABLE OF LOADS IN CWTS ETC. TOTAL LOAD 2864 cwts

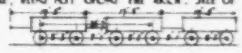
| VOUSSOIR | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| WEIGHT OF CROWN AT 180 LBS. PER SQ. FT. | CWTS. 3 LBS. 24 | CWTS. 8 LBS. 49 | CWTS. 6 LBS. 48 | CWTS. 8 LBS. 19 | CWTS. 6 LBS. 48 | CWTS. 8 LBS. 49 | CWTS. 5 LBS. 24 |
| WEIGHT OF SPANDREL AT 140 LBS. PER CU. FT. | 24 42 | 49 24 | 26 28 | 22 31 | 12 56 | 11 63 | 3 84 |
| TOTAL STRAIN ACROSS | 27½ | 58 | 32½ | 31 | 19 | 20 | 7 |
| WEIGHT OF VOUSSOIRS AT 150 LBS. PER CU. FT. | 11 | 20 | 13½ | 16 | 12 | 15 | 5½ |
| TOTAL TO EA. VOUSSOIR | 38½ | 77½ | 46½ | 47 | 31 | 35 | 12½ |

THE LINE OF RESISTANCE DUE TO THE ABOVE LOADS LIES ENTIRELY WITHIN THE MIDDLE THIRD. THE ARCH IS THEREFORE STABLE AGAINST FAILURE BY ROTATION. FOR CRUSHING AND SLIDING RESISTANCES SEE TEST No. 2.

## TEST No. 2.

DATA

THE EXTERNAL LOAD IN THIS TEST IS THAT OF MODERN HAULAGE TRAFFIC UNDER GOVERNMENT REGULATIONS CONSISTING OF A LOCOMOTIVE AND THREE WAGGONS WITH 9" TYRES. SPEED NOT TO EXCEED 5 MILES IN HOUR. MAXIMUM WEIGHT OF EACH LOADED WAGGON IS 13½ TONS WHICH IS GREATER THAN THE WEIGHT OF LOCOMOTIVE. AS MANY OF THE WAGGON WHEELS AS POSSIBLE HAVE THEREFORE BEEN PUT UPON THE ARCH. SIZE OF WAGGONS AS SKETCH :—



THE ACTUAL WEIGHT UPON THE 9" WIDTH OF WHEEL AND ARCH WILL BE $\frac{13\frac{1}{2} \text{ tons}}{4 \text{ wheels}} = 3\frac{1}{4}$ TONS, AND THE WEIGHT BROUGHT UPON THE UNIT FOOT OF ARCH UNDER CONSIDERATION BY EACH WHEEL. $= \frac{3\frac{1}{4} \times 12"}{9"} = 4\frac{1}{3}$ TONS OR 86 CWTS

THIS CONSTITUTES THE MOST SEVERE TEST LIKELY TO COME UPON THE BRIDGE. THE WEIGHTS OF VOUSSOIRS AND SPANDREL WILL BE SAME AS THOSE GIVEN FOR FIRST TEST.

TABLE OF LOADS IN CWTS. ETC. TOTAL LOAD 582 CWTS.

| VOUSSOIR | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| WEIGHT OF WAGGONS | 85 | | 85 | | 85 | | 85 |
| WEIGHT OF SPANDREL | 24 42 | 49 24 | 26 28 | 22 31 | 12 56 | 11 63 | 3 84 |
| TOTAL STRAIN & WAGGONS | 109½ | 49½ | 111½ | 22½ | 97½ | 11½ | 88½ |
| WEIGHT OF VOUSSOIRS | 8½ | 20 | 13½ | 16 | 12 | 15 | 5½ |
| TOTAL TO EA. VOUSSOIR | 118½ | 69½ | 125 | 38½ | 109½ | 26½ | 94½ |

THE LINE OF RESISTANCE DUE TO THE ABOVE LOADS LIES ENTIRELY WITHIN THE MIDDLE THIRD. THE ARCH IS THEREFORE STABLE AGAINST FAILURE BY ROTATION.

### STABILITY AGAINST FAILURE BY CRUSHING.

FROM STRESS DIAGRAM TEST No. 2 THE THRUST AT ABUTMENT IS FOUND TO BE 45 TONS ACTING AT LOWER EXTREME OF THE MIDDLE THIRD, NORMAL TO JOINT. THE MAXIMUM INTENSITY OF PRESSURE ON THE FIRST VOUSSOIR $= 2 \times \frac{45 \text{ tons}}{2 \cdot 75 \text{ sq. ft}} = 32 \cdot 7$ TONS PER SQ. FT. (WHICH IS 2½ AVERAGE PRESSURE)

DARLEY DALE STONE CRUSHING LOAD = 516·7 TONS PER SQ. FT.

$\frac{516 \cdot 7}{32 \cdot 7}$ = FACTOR OF SAFETY OF 16

THE ARCH IS, THEREFORE, IN BOTH TESTS STABLE AGAINST FAILURE BY CRUSHING.

### STABILITY AGAINST FAILURE BY SLIDING.

AS THE LINE OF RESISTANCE IS IN ALMOST EVERY VOUSSOIR NEARLY NORMAL TO THE JOINT AND THEREFORE WELL WITHIN THE ANGLE OF FRICTION OF MASONRY UPON MASONRY (25°) THE ARCH IN BOTH TESTS IS STABLE AGAINST FAILURE BY SLIDING.

### STABILITY OF ABUTMENTS.

THE WEIGHT OF THE WHOLE EFFECTIVE ABUTMENT (CONCRETE & RUBBLE MASONRY) IS TAKEN AT 140 LBS. PER CUBIC FT. : 461 CUBIC FT. AT 140 LBS = 29 TONS

THE RESULTANT FALLS WELL WITHIN THE MIDDLE THIRD OF BASE AND THE ABUTMENT IS, THEREFORE, SAFE FROM OVERTURNING.

THE MAXIMUM INTENSITY OF PRESSURE ON THE EARTH WILL BE :—

VERTICAL COMPONENT OF THRUST OF ARCH + WEIGHT OF ABUTMENT = 23 + 28½ = 51½ TONS, & MAX: PRESSR. $= 2 \times \frac{51\frac{1}{2} \text{ tons}}{9 \text{ ft} \times 11 \text{ (3 times } \pi \text{ 2)}}$ =

$\frac{4\frac{1}{2}}{2\pi}$ = 4 TONS PER SQ. FT. SAFE LOAD ON COMPACT GRAVEL.

UTILE DULCI.

PHOTO LITHO. SPRAGUE & Co. LTD. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

vibration,
designing
The wh
given as
drawings.'

SOU

THE con
be both
the same
problem
attempted
fully. A
C. L. Nor
of Techno
will be o
some of t
do not di
used in th
as regards
by a scale
place is g
metal lat
2-in. "Ke
"National
were plas
together,
Three-inc
follow at
also give
double pa
with a 2-
efficiency
the advan
felt, and
constructe
on plan),
plaster or
sheathing
studs and
paper, ha
made wit
both sides
boards, a
from 80
studs (st
both sid
metal lat
95; and a
layer of
gained th
fessor No
perty of
that not
could be
by carefu
the wall.
required,
double pl
of Music

EFFLO

MR. S.
Technical
following
examinat
recently
"Altho
action of
main cau
is the pr
in the cl
In the hi
the felsp
of the
'weather
any, trac
earths,
are made
which the
'weathere
At the
the efflor
different
The fi
wall in
faced w
tested c
spectrosc
carbonate
bonate of
The se
in the ba
a compos
only one
work. T
of having
had drai
ceiling w
tion of th
composed

vibration, as was at one time customary in designing road bridges.

The whole of the calculations involved are given as concisely as possible upon the drawings."

## SOUND-PROOF PARTITIONS.

THE construction of a partition which shall be both sound-proof and fire-proof and at the same time thin and inexpensive is a problem which many inventors have attempted to solve, but not always successfully. A report of tests made by Professor C. L. Norton, of the Massachusetts Institute of Technology, has recently reached us, and will be of interest to British architects, as some of the five partitions tested in America do not differ materially from certain kinds used in this country. The relative efficiency as regards non-conductivity of sound is shown by a scale ranging from 30 to 100. The lowest place is given to the 2-in. solid partition of metal lath and plaster. The partitions of 2-in. "Keystone" plaster blocks and of 2-in. "National" terra-cotta blocks, both of which were plastered on both sides, are bracketed together, the index of efficiency being 40. Three-inch and 4-in. "National" partitions follow at 45 and 50, and the latter figure is also given to the 3-in. "Keystone." A double partition of 2-in. "Keystone" blocks with a 2-in. air-space between them had an efficiency of 60. The remaining tests showed the advantage obtained by the use of paper, felt, and "quilt." Two double partitions constructed of ¾-in. steel studs (staggered on plan), and covered with metal lath and plaster on both sides, one partition having a sheathing of water-proof paper between the studs and the other a sheathing of felt and paper, had an efficiency of 75. Partitions made with steel channels and covered on both sides with felt, ¼-in. "Sackett" plaster boards, and a thin coat of plaster ranged from 80 to 85; partitions made with steel studs (staggered on plan) and covered on both sides with Cabot's sheathing quilt, metal lath, and plaster had an efficiency of 95; and a similar partition with an additional layer of quilt (placed between the studs) gained the full number of marks, 100. Professor Norton says that "the insulating property of some of the partitions was so good that not even the blare of a cornet . . . could be heard through the partition except by careful listening within a few inches of the wall." If greater resistance to fire is required, the quilt can be used between double plaster blocks, as in the Conservatory of Music at Boston, Mass.

## EFFLORESCENCE ON BRICKWORK.

MR. S. SMITH, the clerk of works of the Technical College, Glasgow, sends us the following communication relative to an examination of samples of efflorescence recently made at that college:—

"Although generally attributed to the action of the mortar that has been used, the main cause of the efflorescence on brickwork is the presence of alkalies (soda and potash) in the clay from which the brick was made. In the higher grade clays, such as fire-clays, the felspar, which was the original form of the clay, has been so completely 'weathered' that there is very little, if any, trace of alkalies. It is in the brick earths, from which the terra-cotta bricks are made, and the lower grade clays, in which the felspar has not been so completely 'weathered,' that the alkalies are found.

At the New Technical College, Glasgow, the efflorescence was scraped from off two different brick walls and examined.

The first sample was taken from a dado wall in one of the staircases, which was faced with terra-cotta brickwork. When tested chemically, with the help of the spectroscope, it was found to consist of carbonate of sodium, with traces of carbonate of potassium and sulphate of calcium.

The second sample was taken from a wall in the basement, built with bricks made from a composition of shale and clay. There was only one patch of efflorescence on this brickwork. The brick at this place showed signs of having been soaked with the water which had drained from the concrete of which the ceiling was composed. A chemical examination of the substance proved it to be largely composed of sulphate of calcium, with a trace of carbonate present, probably as sodium carbonate, the spectroscope showing the presence of sodium.

The efflorescence on the terra-cotta brickwork would be caused by the carbon dioxide of the atmosphere acting upon the alkalies in the bricks, converting them into the carbonates of sodium or potassium, and the calcium sulphate present would be the product of a combination between the sulphur dioxide in the atmosphere with subsequent oxidation, and any deposit of lime that might have been left on the face of the brickwork by the moisture which had evaporated or drained from the mortar.

The efflorescence on the composition bricks can also be accounted for by the latter cause; the sulphur dioxide acting, as before, upon the deposit of lime left by the water from the concrete, had converted it into sulphate of calcium.

Where the brickwork is exposed to the rainfall, the efflorescence is washed off, and it will gradually get less as the alkalies present in the bricks are progressively removed. Where the brickwork, however, is in the interior of a building there is no rainfall to wash away the efflorescence, and to keep it from becoming unsightly it has to be washed with a plentiful supply of water.

As it is not always convenient to do this, the brickwork should be washed with a diluted solution of hydrochloric acid to clean off any dirt or lime which may have been left on, and which would help to form the sulphate of calcium. Wash again with clean water, then when dry give the brickwork a coat of raw linseed oil. The coat of oil will effectually prevent further action between the carbon dioxide and the alkalies, and thereby put a stop to the efflorescence."

## CARPENTERS' HALL LECTURES:

### GREEK TEMPLES AND RUINS.

THE second of the present series of spring lectures on matters connected with building, arranged for by the Worshipful Company of Carpenters, was delivered on Thursday last week in Carpenters' Hall, London Wall, by Mr. A. Evan Bernays, M.A., whose subject was "Greek Temples and Ruins." The Right Hon. Lord Addington presided.

The lecture consisted of a passing reference to a number of temples and ruins, some fine lantern slides of which were shown upon the screen. The first views shown were of Delphi and the Sacred Way leading up to the temple. The stones of the Sacred Way—some 2,000 years old—had grooves cut in them, said the lecturer, to prevent the feet from slipping, for Delphi is situated high among the rifted hills. In three special ways the religion of the Greeks showed itself at Delphi—*i.e.* (1) by mottoes carved on the temple was taught the lesson of self-control: "nothing in excess"; "know thyself"; (2) by prediction of the future; (3) by stories of the miraculous power of the gods. Little was left of the temple, but we could see something of the impressiveness of the site. When the ancient Greek went up to the temple he went for amusement as well as for worship, as the remains of the theatre showed. Whether there was a raised stage or not was a question on which thousands of pages had been written, but he did not intend to deal with that now. The theatre was open to the sky. Many popular books stated that the theatres were so skilfully built that every word spoken on the stage could be heard in the back rows, and this was certainly true, though the purity of the air had much to do with that. While at Delphi he made some experiments, and he found that every word spoken in the back rows of the theatre could be heard on the stage.

At Athens, the principal building was the Parthenon, and a question that might be asked was, how is it that the building lasted unharmed from the Vth century B.C. to the XVIIth A.D.? It was the chief temple in the chief city of Greece, and Christianity marked its triumph over paganism by turning the building into a church, and it remained a Christian church until 1460, when it became a mosque. In the whole of the Parthenon there was scarcely a straight line, and it was "optical corrections" like that of the curvature of the stylobate which helped to make the beauty of the building what it is. The same tireless devotion to detail which the mediæval mason gave to the elaboration of a cathedral was given by the masons of ancient Greece to their temples. The aim of the Athenians was perfect symmetry and perfect harmony—complete subordination of part to whole. Another building in Athens to which the lecturer drew special attention was the Theseum and the triglyph projections, which showed that the Greek temple was indebted for its design to the wooden temples made by the carpenters of a previous time.

Among other places visited by the lecturer were Ephesus, Pergamon, Halicarnassus, Rhodes, and Cos. Pergamon was situated high above the plain, about twenty-one miles inland from the coast of Asia Minor. The great altar of Zeus, on which 100 oxen could be sacrificed at once, was perhaps the largest altar in the ancient world. Another interesting ruin was the enormous theatre.

A little south of Miletus there stood a temple of Apollo, which Pausanias mentioned as ranking among the finest of all the temples in Ionia after the great temple of Artemis at Ephesus. It was called the oracle of the Branchidae, and the lecturer showed views of some of the remains.

In referring to some red and blue colouring which was still to be seen on a column, he said that it was curious that, while we were apt to imagine a typical Greek temple or Gothic cathedral as showing surfaces of plain stone or marble, the men who made them in each case used bright colour to bring out and emphasise the architectural features.

Some very interesting views of the volcanic island of Thera were shown, the island rising sheer out of the sea and being crowned with white stone and marble houses. There were some of the oldest traces of human habitation in the Ægean, and some stone beams where the construction was quite primitive, and clearly showed but a recent evolution from wood beams.

A hearty vote of thanks to the lecturer and the chairman brought the proceedings to a close.

## THE BUILDERS' FOREMEN AND CLERKS OF WORKS' INSTITUTION:

### ANNUAL DINNER.

THE annual dinner of the Provident Institution of Builders' Foremen and Clerks of Works was held on Saturday last week at the King's Hall, Holborn Restaurant, Mr. Henry Holloway, J.P. (Messrs. Holloway Brothers), presiding. There were also present:—Messrs. C. Ansell, J. Carmichael, Scott Balfour, J. Bolding, C. Bussell, T. Costigan, F. L. Dove, F. Higgs, J. S. Gibson, T. Holloway, Spencer Green, J. Marsland, C. H. Mabey, D. W. McInnes, G. M. Nicholson, W. Phillips, W. Reason, J.P. (Mayor of Finsbury), Alex. Ritchie, E. H. Selby, H. B. Sanders, J. Beer, J. R. Cochrane, F. Hann, J. Stapleton, and a large party of members and friends, the company numbering 644.

The loyal toasts having been honoured,

The Chairman proposed the toast of "The Provident Institution of Builders' Foremen and Clerks of Works." He said that the fact of there being a record attendance that evening showed that the Institution, though an old one, was not by any means losing its popularity; in fact, he did not know of any other institution connected with the trade which seemed to be so popular as the Institution, and he hoped it would continue to be prosperous. It was a charity which must appeal to many of them very strongly, and when he remembered its objects he felt it ought to appeal, in the first place, to master builders. By its very title the Institution showed that it was possible to have harmonious union between clerks of works and general foremen, and master builders were delighted that it was so, and that it was possible to have these relations not only in the Institution, but also on the works. Another object the Institution had was to maintain the respectability of its members, and he supposed that was necessary in these degenerate days, though he believed, speaking generally, that the builders' foremen and clerks of works were as good a set of men as any to be found. The Institution also had an old age pension fund, and he was delighted to know that it was doing such

splendid work for members who had reached an age when they were no longer able to follow their calling in life, and who were then assisted in a substantial way. The Institution rendered assistance to the aged and infirm, made provision for widows and orphans, and gave temporary relief under special circumstances when assistance was needed. The pensions granted to members amounted to 17s. 6d. per week to a member who had passed the age for following his employment; of 7s. per week for a widow, with an allowance for orphans. These were the maximum allowances, and if the funds fell short the weekly payments had to be reduced; but at the present time, he was happy to say, the maximum amount was being paid to all pensioners on the funds. The amounts were not excessive, and yet the members of the Institution depended on outside help to continue them, for their own contributions were insufficient for the purpose. This was the only appeal they made, and on behalf of those members of the Institution who had passed work, he appealed to all those who could assist to give, and thus make happy the last days of those who had served them.

Mr. John Beer, secretary, whose name was coupled with the toast, responded, and in doing so he ably supported the chairman's appeal. When he became secretary the pensioners were paid 12s. 6d. per week, which amount was subsequently increased to 15s., and later on to 17s. 6d.; but he was anxious to make it 1*l.* per week, and 10s. per week for widows.

Mr. F. Higgs, in proposing the toast of "The Architects and Surveyors," said that architects were the aristocrats of the craft, but there were many different kinds of architects. At one time he wished he had been an architect, but he had got to feel differently now, for if there was anything wrong with a building the architect was generally blamed. Shakspeare must have been thinking of architects when he wrote:—"The evil that men do lives after them."

Mr. J. S. Gibson, who responded for the architects, said he was rather amused to hear Mr. Higgs refer to architects as the aristocrats of the building world. It was rather amusing for an architect who usually had to put up with the little eccentricities of his client, and to act as a sort of buffer between the demands of a client, which were often onerous and difficult to fulfil, and the desires of a builder, which were always, of course, just and equitable. Speaking of what he called the different portions of the building world, *i.e.*, the architect, the builder, the clerk of works, the builder's foreman, and the workmen, he said that they were all really part of one organisation. Each had to do his little, and the whole was fitted together, dovetailed, like some puzzle, and the result should be what was wanted. It was a matter of little moment whether they differentiated—whether one or the other did the greater or the lesser part; but it was the object of all to do their work well, to do it in such a manner that it would be a pride to them and a pleasure to those who came after them. Such gatherings as that tended to make them better comrades.

Mr. G. M. Nicholson, who replied for the surveyors, referred to the advantages of societies like that Institution. The best way to meet distress or misfortune in life was by co-operation. There was a certain percentage of people who every year met with misfortune, and by means of an institution like the Builders' Foremen's Institution the fortunate helped to pay for the unfortunate, and it was the duty of everyone connected with the building trade to encourage a society of this kind in every way.

Mr. D. W. McInnes suitably proposed the toast of "The Builders and Contractors," and said that, so long as the Institution had the support of men like their chairman and others, the members of the society need have no fear that they would not be well looked after.

Mr. J. Carmichael responded, and said that as builders they ought to do all in their power to foster that spirit of comradeship between builders and their foremen and clerks of works, which was shown in the reception of the toast. A quality which was necessary nowadays was "gumption," and there was plenty of opportunity for showing it on a large building work. In addition, if they had ability or capability and amiability, they would be pre-eminent in their work, and the result would be satisfactory to all parties concerned.

Mr. F. Hann, financial secretary, having appropriately proposed "The Governors, Trustees, Donors, Subscribers, and Visitors," and Mr. W. Reason, J.P., having replied,

Mr. T. Costigan, secretary of the Master Builders' Association, proposed the toast of "The Chairman," remarking that Mr. Holloway had filled every post of honour that his brother builders could confer upon him, and he and his partners were constantly giving assistance to deserving causes.

The toast was received with musical honours, and the Chairman briefly replied.

During the evening Mr. Hann read a long list of subscriptions and donations received or promised on behalf of the Institution, the total of which amounted to 502*l.*, included in which was 25*l.* from Messrs. Holloway Brothers.

## THE LONDON MASTER BUILDERS' ASSOCIATION.

THE thirty-fourth annual general meeting of this Association was held on the 22nd ult. at Nos. 31 and 32, Bedford-street, Strand, when the annual report was presented. The following paragraphs occur in the report:—

"The membership is steadily increasing, but there are a number of firms who have not yet joined the Association. To remedy this, steps have been taken to make known to the whole of the building trade of London the objects and work of the organisation, and individual members are urged to take an active personal interest in seconding the Council's effort in this direction. In consequence of the large and important element of organised labour imported into Parliament at the recent General Election, it becomes more imperative than ever that employers should stand together for mutual protection.

No disputes of any moment have occurred during the last year, all differences between employers and workmen having been satisfactorily adjusted by the conciliation boards, whose operations your Council takes this opportuity of referring to in terms of the highest praise. Both employers and workmen have loyally abided by the boards' decisions, thus avoiding much possible trouble, and, at the same time, bringing about a better state of mutual sympathy and understanding.

Acting on instructions given at the last annual general meeting, your Council sent formal notices terminating the old rules to the various societies with whom the London Master Builders' Association had entered into agreements. The primary reason for this action was the necessity of making fresh and more satisfactory arrangements as to the winter working hours. Advantage, however, was taken of the opportunity offered by the conferences to make the rules with all the trades as uniform as possible, and in this, your Council ventures to say, it has been distinctly successful. New rules were agreed to with the bricklayers, carpenters and joiners, stonemasons, plumbers, and general smiths and fitters, but your Council failed to come to an agreement with the mill sawyers, and declined to enter into agreements with the labourers, painters, and crane drivers. Your Council urges upon all members of the London Master Builders' Association to carry out strictly the letter and intent of the new rules, and to regard them as serious contracts, the careful observance of which cannot fail to be advantageous to all concerned. The notice to the plasterers does not expire until March 3 next. A conference was held with their representatives in October last with a view to a working arrangement as to winter hours pending subsequent consideration of the whole subject. This came to nothing. Your Council considered that in the present depressed condition of trade there was no longer any justification for the preferential position which the plasterers obtained in 1900, and that they should accordingly be required to fall into line with the other trades in the matter of wages. A conference was held on January 1, 1906, with the representatives of the N.A.O.P., at which all the new rules were accepted except that relating to wages. Arbitration was offered as a solution of the difficulty, and the conference was adjourned to ascertain the wishes of the whole of the workmen on the point. The result of this was unfavourable to arbitration, but, at the request of the N.A.O.P., a further conference was held on February 9, when the alternative was placed before the workmen's representatives of accepting the proposed new rule or having no rules at all. They then agreed to again consult their members, and the final result is still awaited. Before dealing with the plasterers, your Council was careful to obtain the views and support of the members of the London Master Builders' Association, and to meet in conference the leading master plasterers of the metropolis who were in entire agreement with the course your Council was adopting.

Your Council has given its attention to all Bills affecting the building trade before Parliament. Together with the Institute of Builders, it opposed the London County Council London Building Acts (Amendment) Bill, 1905. Petitions were lodged in the Houses of Parliament, counsel and solicitors were engaged, and Mr. William Shepherd gave evidence. This proceeding entailed a heavy outlay, and it is hoped that, should necessity for the like action arise in future, some arrangement for joint representation may be come to with kindred societies to avoid the present excessive cost of Parliamentary opposition. The trade generally is under great obligations to Mr. Wm. Shepherd for his valuable services, and your Council desires to place on record its high appreciation of the able manner in which that gentleman discharged his voluntary and onerous duties.

The financial position of the Association continues to improve year by year, though the marked depression in trade last year affected the income to a considerable extent. In addition, the resources were taxed by the heavy expenditure incurred in opposing the London County Council London Building Acts (Amendment) Bill, 1905, and by other necessary legal expenses. Further stock was purchased for the benefit of the reserve fund.

Your Council deeply regrets the loss by death of three esteemed and honoured past presidents in the persons of Mr. Benjamin Hannen, Col. Stanley G. Bird, C.B., and Mr. George James Lough.

In consequence of the lack of accommodation in the present offices, your Council has decided, in the interests of the Association, to acquire more suitable premises. The Institute of Builders and the Builders' Benevolent Institution will occupy the new offices conjointly with the Association."

The report was adopted, and the audited accounts and balance sheet were received.

The following gentlemen were then elected:—

As President, Mr. J. W. Lorden (Messrs. W. H. Lorden & Sons).

Senior Vice-President, Mr. F. L. Dove (Messrs. Dove Bros., Ltd.).

Junior Vice-President, Mr. W. Lawrance (Messrs. E. Lawrance & Sons).

Treasurer, Mr. F. G. Rice (Messrs. Rice & Son).

Hon. Auditor, Mr. A. B. H. Colls (Messrs Colls & Sons, Ltd.).

The following were elected members of the Executive Council:—Mr. G. Appleton (Messrs. Turtle & Appleton), Mr. F. Bywaters (Messrs. Bywaters & Sons, Ltd.), Mr. F. G. Minter, Mr. F. P. Rider (Messrs. T. Rider & Son), Mr. H. J. Shelbourne (Messrs. J. Shelbourne & Co.), Mr. Howell J. Williams, L.C.C. (Messrs. Howell J. Williams, Ltd.), Mr. E. J. Hill (Messrs. Higgs & Hill, Ltd.), Mr. Leonard Horner (Messrs. Ashby & Horner).

## THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, S.W., Sir E. Cornwall, M.P., Chairman, presiding.

*Payment of District Surveyors by Salary.*—The adjourned report of the Building Act Committee on the subject of the payment of district surveyors by salary was discussed at some length. The Committee, as we stated last week, had again submitted proposals similar to those discussed on January 30, and dealt with in our issues for December 16 and February 3. The Committee now recommended:—

"(*a*) That as from and including April 1, 1906, all district surveyors be paid a fixed salary by way of remuneration instead of fees; that the amount of salary to be paid to each of the present district surveyors be equal to the amount of the average of the fees received in his districts during the seven years ended December 31, 1905, as provided in sect. 158 of the London Building Act, 1894; and that the Building Act Committee do submit the necessary recommendations to give effect to this decision.

(*b*) That with regard to the existing and all future vacancies, the Building Act Committee do submit to the Council such recommendations, giving full particulars of their proposals in every case, as will be in general accord with the "model" scheme described in the report of the Building Act Committee, dated February 12, 1906."

Capt. Hemphill, in moving the adoption of the report, said that a mysterious document had been received by members on the subject, and that the solicitors, to whom it had been submitted, said that the statements contained in it were altogether inaccurate. As to the general question, in the surrounding districts surveyors were paid by salary, and not by fees, and if district surveyors were paid by salary their status would not be altered.

Mr. A. Smith said that no serious complaints had arisen in regard to the present system, and he was opposed to the proposed change. There was great risk that, instead of effecting an economy, a serious loss would result.

Mr. Phillimore said that the report of the Finance Committee was exaggerated in its fears. The upward tendency of fees was almost certain to continue, and if the proposals of the Committee were carried, there would be an additional margin in the future. There had been grievous defects in the past under this system, and, for the sake of proper control, he asked for a straight vote. He hoped they would not be misled by vested interests, and he was convinced that it was only by carrying the Committee's proposals that they could hope in the future to secure good work.

Col. Rotton said that the proposals had been very recently defeated by a large majority, and not one of the arguments then used had been met. The Council had before it the same proposals with a few trimmings to pass them off. He hoped the Council would not waste time in discussing the

matter, but would proceed to reaffirm its recent decision.

Mr. Howell J. Williams referred to the present commitments of the Council, and said he thought the Committee's recommendations, if carried, would result in a heavy cost to the Council. He had made inquiries, and he found that district surveyors were very ready to make abatements in their fees in special cases, and they were free to do so, but under the proposed arrangement he did not see how that could be done by the Council. He believed that, as a consequential step to the appointment of district surveyors, payment by salary was logically right, but the time was not ripe for that. Fresh legislation must be obtained before it could be done. The Building Act Committee was overwhelmed with work at the present time, and these proposals would lead to another department and staff—the District Surveyors' department—with highly-paid officials to supervise the district surveyors. All this was necessary only if they had no confidence in the men they appointed, but there was a keen sense of honour and integrity amongst architects and surveyors of London.

A member: And builders?

Mr. Williams: There might be a small class of jerry-builders in London, but they were in a small minority compared with the builders who had practically rebuilt London during the last thirty years. It was essential that the Council should maintain a class of district surveyors who would be in a practically independent, or quasi-independent, position. The public would not tolerate being harassed in the administration of the Act; the Act should be carried out in a spirit of sweet reasonableness, whereas the present proposals would lead to the Act being administered in a cast-iron way.

Sir Melville Beachcroft said he could not help feeling regret that the Chairman had again brought up this matter. He had heard no good reasons for the proposed changes. He understood that 52,000*l.* a year was collected under the present system, and he greatly doubted whether that sum would be collected under the proposed system; that amount might be regarded as the high-water mark, and, London being much more built over than it was, it was probable that the fees would go down rather than up. They were far more likely to get experienced men under the present system than under that proposed. They could not ignore the views in the matter of such an important body as the Royal Institute of British Architects, whose circular letter on the subject they had received.*

Mr. Goodman said it was impossible to carry out the scheme as proposed. By clause 158 of the Act the Council was empowered to pay by salaries if they so decided, but, according to the terms of that clause, the Council would, if they agreed to put that into effect, have to pay more in the way of salaries than they contemplated. He believed that there would be no saving as was promised, but a loss of 25,000*l.* per annum. Again, if this scheme were carried, one part of the income of the surveyor would be by fees which the Council could not help paying, and another part by salary. It was quite time that the Act was altered. He thought they should have a report showing how much it had cost to fight Building Act cases during the last three years.

Lord Welby, Chairman of the Finance Committee, said that the Finance Committee did not view the proposals of the Building Act Committee with favour. He thought that the amount surveyors would be entitled to according to clause 158 was more than the committee thought, and he believed that the proposals would cost the ratepayers a good deal. He moved that the recommendation be referred back for further consideration.

Mr. Torrance seconded.

Mr. Radford opposed the scheme, and also referred to the effect of clause 158, and to the prospect of the scheme costing a good deal more than the committee supposed. He thought that the proposals should go back, and that any future proposals should come up in the form of recommendations to go before Parliament.

Capt. Hemphill said that the point as to clause 158 had been submitted to the solicitor for consideration, and he said there was nothing in the point. He thought that fees would go up rather than down. As to the circular letter from the Royal Institute of British Architects, the Council decided, in 1890, that it was undesirable that district surveyors should have private practice; there were great evils in such a system. The proposals of the Committee, if carried, would tend to efficiency of administration. Payment by fees was an obsolete system, and there would be no serious difficulties in carrying out what he proposed.

The Council then voted, with the following result:—For the amendment, fifty-nine; against, forty. The proposals were therefore referred back to the Committee.

*Vauxhall Bridge.*—Mr. Straus, chairman of the Bridges Committee, announced that the new Vauxhall Bridge would be opened for traffic in April.

*Reconstruction of Tramways in Battersea.*—The following recommendation of the Highways Committee was agreed to:—

"That the estimate of expenditure on capital account of 19,600*l.*, submitted by the Finance Committee, representing the consideration upon which the Battersea Metropolitan Borough Council will be prepared to release the Council from its obligations as the successor of the South London Tramways Company to pave more than the usual tramway area governed by the provisions of the Tramways Act, 1870, in connexion with the tramways in the borough of Battersea to be reconstructed for electrical traction, be approved."

*Bridge Carrying Kingsland-road over the North London Railway.*—The Bridges Committee recommended, and it was agreed, that an agreement be entered into with the North London Railway Company, providing for the reconstruction by the Council of the bridge carrying Kingsland-road over the Docks branch of the North London Railway in connexion with the reconstruction for electrical traction of the first section of the electrical traction.

*Railway Bridges.*—They also reported that the bridge which carries the South-Eastern and Chatham Railway over Blackfriars-road is about to be reconstructed. The present headway of this bridge is 18 ft. 9 in., and it is proposed to reduce this to 18 ft. 3 in. The company does not intend in any other important respects to modify the present design of the bridge. The Committee were of opinion that, subject to the work being executed in such a manner as will not interfere in any way with the work of the Council's tramways, no objection need be raised to the company's proposals. The company had also submitted a plan showing the proposed reconstruction of the bridge carrying the company's lines over Mepham-street. The proposals were agreed to.

*General Lines of Buildings in Fulham-road and Fulham Park-road.*—The Building Act Committee reported as follows:—

"On May 3, 1904, we reported that a successful appeal had been made to the Tribunal of Appeal against the certificate of the architect of the Council, acting in the capacity of superintending architect of metropolitan buildings, defining the general line of buildings on the south side of Fulham-road, westward of Munster-road. We have now to report that on December 22, 1905, the superintending architect defined the general line of buildings on the western side of Fulham Park-road between Fulham-road and Langridge-road, that an appeal was made against his certificate, and that on January 23, 1906, the Tribunal of Appeal reversed the certificate, and decided that there was no general line of buildings on the western side of the street leading from Fulham-road to the junction of Fulham Park-gardens and Fulham Park-road. The result of this decision is that, except in so far as the provisions of sect. 13 of the London Building Act, 1894, as to the prescribed distance may apply, there is nothing to prevent the erection of houses on the site in question close up to the public way. In order that the effect of these decisions of the Tribunal of Appeal, which enable the applicants to build very considerably in advance of the lines defined by the superintending architect, may be clearly understood, we have given instructions for a cartoon to be prepared and hung in the Council chamber. . . ."

The consideration of the matter was postponed.

*London-street Site, Ratcliff—Bekesbourne-buildings (second section).*—The Housing of the Working Classes Committee recommended, and it was agreed, that expenditure on capital account not exceeding 500*l.* be sanctioned for the preparation of working drawings, specifications, and bills of quantities, and for the preliminary work in connexion with the erection of the second section of Bekesbourne-buildings, in London-street, Ratcliff.

The Council adjourned shortly before eight o'clock.

* The letter is printed on another page.

## APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

*Lines of Frontage and Projections.*

*Wandsworth.*—A parish hall on the northern side of Waynflete-street, Earlsfield, and a house on the western side of Tranmere-road, to abut upon Waynflete-street (Mr. F. E. Halford for the Rev. D. Tudor Craig).—Consent.

*Hackney, Central.*—Projecting shops in front of Nos. 210, 212, 214, and 216, Mare-street, Hackney (Messrs. Hodson & Whitehead for Messrs. H. & H. W. Rowlandson).—Consent.

*Kensington, North.*—An iron and glass shelter in front of No. 17, Pembridge-square, Kensington (Messrs. S. Dowsing & Sons, Limited).—Consent.

*Brixton.*—The retention of a wood, glass, and zinc roof at the side of No. 144, Coldharbour-lane, Brixton, abutting upon Eastlake-road (Mr. F. Karno).—Consent.

*Fulham.*†—Buildings on the south side of Broughton-road, Fulham (Messrs. Badenoch & Bruce for the directors of Messrs. Loud & Western, Limited).—Consent.

*Hammersmith.*—A porch in front of the Baptist Chapel on the west side of the Bloemfontein-road, Hammersmith (Mr. R. N. Hewitt for the building committee of the chapel).—Consent.

*Islington, South.*—An addition (jointing chamber) in front of the Barnsbury Telephone Exchange, Barnsbury-grove, Islington (Mr. C. Elliott for the National Telephone Co., Limited).—Consent.

*Paddington, North.*—Re-erection of Nos. 95 to 103, Maida-vale, Paddington, with projecting porches and bay windows (Messrs. Boehmer & Gibbs for Mr. F. Britton).—Consent.

*Strand.*—A projecting clock in front of Nos. 127-130, Long-acre, Strand (Mr. E. R. Burch for Messrs. Morgan & Co., Limited).—Consent.

*Westminster.*—A projecting porch in front of No. 121, Victoria-street, Westminster (Messrs. Farebrother, Ellis, & Co., for Mr. V. S. Galsworthy and Mr. F. T. Galsworthy).—Consent.

*Woolwich.*—That the application of Mr. J. M. Peate, for an extension of the period within which the erection of a Welsh Congregational Chapel on the northern side of Willenhall-road, Woolwich, was required to be commenced, be granted.—Consent.

*Wandsworth.*—Buildings on the northern side of Mitcham-road, Tooting, to abut upon Ensham, street (Mr. H. J. Marten for the Council of the Metropolitan Borough of Wandsworth).—Consent.

*Kensington, North.*—Bay windows and porches to twenty-six houses on the south side of Oxford-gardens, Kensington (Messrs. Trant Brown & Humphreys for Messrs. Daley & Franklin).—Consent.

*Woolwich.*—That the application of Mr. O. Fleming on behalf of the Fire Brigade Committee of the Council for an extension of the periods within which the erection of a projecting pent roof to the fire brigade station on a site on the north-east side of Eltham-road, Lee, and western side of Meadow-court-road, was required to be commenced and completed, be granted.—Consent.

*St. George, Hanover-square.*—A projecting sign in front of No. 45, New Bond-street, St. George, Hanover-square (Messrs. G. & F. Kent for Mr. E. Charvet).—Consent.

*Strand.*—The retention of an illuminated sign in front of No. 14, Hanover-court, Long-acre (Mr. J. P. Choate for Mr. F. H. Berry).—Consent.

*Woolwich.*—The re-erection of No. 4, George street, Woolwich (Mr. J. O. Cook for Messrs. J. Frankling & Son).—Refused.

*Islington, North.*—A porch in front of St. Paul's Church, Kingsdown-road, Islington (Mr. A. B. Cook).—Refused.

*Kennington.*†—An iron and glass covered way in front of St. Mark's Vicarage, Kennington-oval (Mr. W. Fitch for the Rev. J. Darlington).—Refused.

*Marylebone, East.*†—An iron illuminated sign at the Queen's Hotel, No. 104, Oxford-street (Mr. T. Holland).—Refused.

*St. George, Hanover-square.*—The retention of a wood and glass showcase in front of No. 8, Grafton-street, St. George, Hanover-square (Messrs. F. Sage & Co. (1905), Limited).—Refused.

*Hackney, South.*—Additions to No. 17, Sutton-place, Hackney, to abut upon Urswick-road (Mr. W. Gibbons for Mr. A. Escott).—Refused.

*Width of Way and Lines of Frontage.*

*Battersea.*—The retention of a one-story building at the rear of No. 54, Winstead-street, Battersea, abutting upon Surrey-lane (Messrs Greenfield & Cracknall for Mr. F. C. Greenfield).—Consent.

*Camberwell, North.*—Houses for persons of the working class on the north side of Beckett-street, the east side of Toulon-street and the east and west sides of Baily-street, Wyndham-road, Camberwell (Mr. Oxtoby for the Council

of the Metropolitan Borough of Camberwell).—Consent.

*Chelsea.*—A deviation from the plan approved for the erection of artisans' dwellings on the north-eastern side of Pond-place, Chelsea, so far as relates to an alteration in the position of the forecourt fence at the corner of Pond-place and the roadway leading to Onslow-dwellings (Messrs. Joseph & Smithen for the Council of the Metropolitan Borough of Chelsea).—Refused.

*Width of Way and Uniting Buildings.*

*Southwark, West.*—An open shed on the north side of Sumner-street, Southwark (Mr. F. Bailey for the City of London Electric Lighting Co., Limited).—Consent.

*Lines of Frontage and Space at Rear.*

*Lewisham.*—Four houses on the southern side of Tressillian-road, Brockley (Mr. H. J. Glanville).—Consent.

*Formation of Streets.*

*Norwood.*†—That an order be issued to Mr. C. J. Bentley, sanctioning the formation or laying out of a new street for carriage traffic to lead from Eastmearn-road to Chatsworth-road, West Dulwich, Lambeth (for Mr. L. S. Rogers and Messrs. A. & E. Rowberry).—Consent.

*Lewisham.*—That an order be issued to Mr. W. H. Collier sanctioning the formation or laying out of new streets for carriage traffic upon the Hilly-fields-park estate, Vicar's-hill, Lewisham (for the trustees of the Jerrard estate).—Consent.

*Woolwich.*—A deviation from the plan approved for the formation or laying out of a new street for carriage traffic to lead from Fernhill-street to Auberon-street, North Woolwich, so far as relates to an alteration in the levels of the proposed street (Messrs. Tapp Jones & Son).—Consent.

*Wandsworth.*—That an order be issued to Messrs. Briant & Son, sanctioning the formation or laying out of new streets for carriage traffic out of Wavertree-road and Nuthurst-avenue, Brixton (for Mrs. A. A. Coffee and the Westminster Investment Society, Limited).—Consent.

*Fulham.*—A deviation from the plan approved for the formation or laying out of a new street for carriage traffic, to lead from Fulham Palace-road to Colehill-lane, Fulham, and in connexion therewith, the erection of buildings so far as relates to the substitution for the two blocks of residential flats, marked Nos. 1 and 2 on the approved plan, of four shops (Mr. A. Blackford).—Consent.

*Lewisham.*—A building at the rear of No. 363, High-street, Lewisham (The Magneto Motor Cycle and Electrical Engineering Company).—Consent.

*Alteration of Buildings.*

*Kensington, South.*—Removal of a fence at the rear of No. 2, Kelso-place, Kensington, and also to the closing of openings in the rear wall of such building (Mr. G. E. Bucknill).—Consent.

*Strand.*—An infringement of the provisions of section 77 of the Act, so far as relates to the uniting of No. 45, Piccadilly, with a building on the eastern side of Albany-courtyard (Mr. G. D. Martin).—Refused.

*The recommendations marked † are contrary to the views of the local authorities.*

## *ARCHITECTURAL SOCIETIES.*

GLASGOW INSTITUTE OF ARCHITECTS.—The usual quarterly meeting of the Glasgow Institute of Architects was held on the 21st ult. Mr. William B. White, Glasgow, was elected a member of the Institute. It was intimated that, in addition to the prize of 2*l.* 2s. given by the Institute, gained by Mr. William Ralston, a second prize of 1*l.* 1s. had been awarded to Mr. Thomas A. M'Adam in the competition for the Institute's prize in the Technical College. Messrs. Crawford and Lindsay were appointed adjudicators for the School of Art prizes. A draft letter regarding the subject of the number of apprentices employed in architectural offices was submitted, and it was agreed that the letter should be issued to the members of the Institute.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—At the rooms of this Society on Thursday, the 22nd ult., Mr. A. W. Waddington delivered a lecture on "Domestic Architecture: Some First Principles"; Mr. R. A. Smithson in the chair. The lecturer commenced by indicating his impression of the exact position of the various claimants to the title of domestic architecture. The first is the work of the average building draughtsman, whose idea of a home is that of a convenient bodily resting-place and shelter, and nothing more. A more exclusive, or, rather, inclusive, claimant is the work of a true architect. The third claimant is an intermediate one, falling between two stools, inasmuch as it is not in healthy contact with building materials and not in reach of artistic touchstones. It is because the vast bulk of modern houses show this unsatisfactory stage of development that a discussion of first principles is necessary. The ideal architect is the philosopher among the builders, and a philosopher is one who is genuinely in love with ideas—*i.e.*, vital first principles. Amongst the main first principles of this sort are those of "the one and the many," from which principles of harmony and variation, subordination and individuality are evolved. The dangers of exaggerated unity are monotony and slavishness; those of exaggerated diversity are restlessness and licence. The especial problem of to-day is how to obtain unity without monotony. The lecturer's excuse for an insistence upon the obvious in theory was that it was obviously forgotten in practice. Turning to illustrations of this main first principle of the interplay of subordination and freedom in architecture, the two great types are found in Greek and Gothic. Modern work reaches neither the obedience to perfect law shown in the one, nor yet the perfect liberty of the other. A house is a group of units—rectangles necessitated by rooms and other divisions. In the relation of these units natural inequality suggests the needful diversity; true scale and proportion, and, above all, simplicity of main lines, tends to unity. In detail the roof is the first consideration, as giving dominant boundaries, vertically and horizontally; the windows, as the eyes of the building, are the next consideration, as giving brightness and interest. To attain unity the main rectangle of the block should never be confused by subordinate parts; equality between natural divisions is usually bad; proportions should be subtle, and not too obvious in value. The unit of subdivision (as in window-panes) should be carefully selected, and not changed without reason; hips or gables are not interchangeable on equal terms. Changes of method were changes of key, varieties of materials, and of colours also, and should be kept to a minimum. On the other hand, a variation of minor features gives interest, and symmetry, as in gables, gains by contrast with unsymmetry elsewhere. But counsels of perfection, if of use at all, are useful as items of good taste, and good taste is a trained capacity to grasp first principles—first in feeling, then in thought. In attaining good taste sympathy with the individual artistic value of materials is requisite, and co-operation between mind and matter, sufficient not only to make a physical rearrangement, but a mental creation of beautiful form.

NOTTINGHAM ARCHITECTURAL SOCIETY.—The annual dinner of the Nottingham Architectural Society was held at the George Hotel on the 23rd ult., the President (Mr. A. W. Brewill) presiding, being supported by the Mayor of Nottingham (Councillor A. Cleaver), Alderman Sir John Turney (chairman of the Works and Ways Committee), Dr. Boobbyer (Medical Officer of Health), Messrs. W. D. Pratt (Vice-President), A. N. Bromley, E. R. Sutton, A. Marshall, R. Evans, jun., A. E. Heazell, F. Booker, W. B. Starr, H. W. Lockton (Newark), A. W. Bradshaw, and W. B. Savidge (hon. secretary). Mr. E. R. Sutton, in proposing the toast of "The Mayor and Corporation of the City of Nottingham," said architects, however, had a grievance—first, that the Corporation did not recognise them as a Society, and it would be an advantage if they would confer with them on such questions as the positions of the different statues and with regard to the Castle gateway, its rebuilding or restoration. They as architects came in closer contact with the Works and Ways Committee than any other committee, and he was voicing the feelings of the architects when he said that, from the chairman to the lowest official, they were always ready to give them any assistance and help in the many difficult problems which from time to time were placed before them.—The Mayor replied.—Sir John Turney proposed "The Architectural Society," saying he realised that the men who followed the profession of architecture had great responsibilities; how great they did not all realise. The welfare of a city, its sanitary conditions and arrangements, depended very much upon how the architects advised their clients and insisted upon the work being carried out. After thirty years' experience he came to the conclusion that the architects and builders of Nottingham did their work a little better than it was done in most towns. It was important that there should be a very strong desire that everything an architect touched should be beautiful, should be useful, and should be good. Without those three elements they could understand that a city might be built up in a short or a long time, and when it was done not be a thing to please or to command the admiration of the people who visited the city. He hoped that the gentlemen connected with the Architectural Society would do all they possibly could to assist the officials of the Corporation in making the town better to live in and more beautiful to look at.—The President responded, remarking with regret that architectural work in Nottingham had been very quiet, and he was very sorry to say that in the present year he did not see very much prospect of there being any improvement. But, at any rate, he could assure the Mayor that the education of architects during the last few years had very much improved. The last two years had been important years for the Royal Institute of British Architects, and a sub-committee had been appointed, of which he was a member, to draw up a Bill to be laid before Parliament for the registration of architects. They felt that all gentlemen who desired to become members of the architectural profession should do so only by being qualified by examination. As was the case in the movement for the proper qualification of doctors, the opposition had come from the leading men in their profession, while the great body of the younger men were in favour of it. The question had not been before them at the last election of the council as the great issue, and he appealed to architects at the next election not to vote for the men who were well known, but were against registration, but for those anxious to secure the registration. In conclusion, Mr. Brewill acknowledged the kindness and courtesy Sir John Turney had always extended to the architects in the city, and suggested that the Corporation should throw open important works that were to be carried out to competition among Nottingham architects, for the city would gain, getting a very carefully thought-out building at a very much less cost. Another grievance was the tendency to take the valuation of buildings and land out of the hands of the architects and place it in the hands of the estate agents. He contended that the architect and estate agent should act conjointly.—The Vice-President proposed the "Master Builders' Association," and, in replying, Mr. F. H. Fish said the relations between the builders and the men were in a perfectly satisfactory state now, the difficulties had been settled, and they only regretted that there was not more work.

## *ARCHÆOLOGICAL SOCIETIES.*

BRITISH ARCHÆOLOGICAL ASSOCIATION.—A meeting was held on Wednesday, February 21, when the Hon. Treasurer (Mr. R. H. Forster) occupied the chair. Mr Andrew Oliver gave an interesting address dealing with the memories and associations connected with the old buildings of the Strand and Whitehall. Of the old Royal palaces and stately mansions of the nobility which once lined the river bank there are but few traces now remaining, the Banqueting House at Whitehall, the water-gate of Buckingham House, the Chapel of the Savoy, and the water-gate of Essex House, at the end of Essex-street, still exist, and, with the names of the streets which cover the sites of the demolished buildings, serve to recall the historic associations of this ancient thoroughfare of the Strand. The lecture was well illustrated by fine photographic reproductions of old maps, prints, and engravings from Mr. Oliver's extensive collection of old London views, which were exhibited by lantern light. Many of these old prints are very rare. Mr. Emmanuel Green, Mr. S. W. Kershaw, Rev. W. S. Sach-Szyrma, Mr. Compton, and others took part in the discussion which followed.

SOCIETY OF PAINTER-ETCHERS.—The twenty-fourth annual exhibition of this Society, opened this week at the gallery of the Society of Painters in Water-Colours, is one of the best they have ever held. We defer detailed notice of it till next week, in order to do better justice to its contents, our space being unusually crowded this week.

## *ENGINEERING SOCIETIES.*

THE JUNIOR INSTITUTION OF ENGINEERS.—Through the courtesy of Mr. A. P. Trotter, the electrical adviser to the Board of Trade, who was, however, unfortunately prevented through indisposition from receiving them as intended, the members were enabled to pay an evening visit to the Electrical Standards Laboratory, Whitehall, on February 19. The standard ampère balance and standard 100-volt voltmeter were shown, the former measuring to sixty-five parts in a million and the latter to eighty-four parts in a million. By means of other balances and shunts currents up to 10,000 ampères can be measured, and there are other voltmeters which register up to 12,000 volts. Smaller currents and pressures are measured by potentiometers. In a very small room, which is kept at a constant temperature by an automatic device, the standard ohm and other important resistance coils were seen, and the process shown for the comparison of ohms to the exactitude of one part in a million. The testing of meters was explained in the verification-room, and a number of different types of meters were on view undergoing the exhaustive test for official approval of "construction and pattern." Outside in the area is a battery-room, a rheostat for controlling 10,000 ampères, and a dynamo and booster-room. Other small dynamos were seen in the repair shops, as also a rotary converter for one, two, or three-phase transformers. Before the members dispersed, their thanks to Mr. C. W. S. Crawley and Mr. J. Rennie, who had kindly shown them round, were cordially expressed. Mr. Trotter is giving a paper on "Acceleration and Accelerometers" before the Institution on March 2, and on March 10 the Institution's annual conversazione takes place at the Westminster Palace Hotel, when one of the special features of the evening will be an exhibition of engineering and scientific models, specimens, etc.

## BOOKS RECEIVED.

ELECTRICITY METERS. By Henry J. Solomon. (Chas. Griffin & Co. 16s.)

THE RESTORATION OF THE GILD SYSTEM. By Arthur J. Penty. (Swan Sonnenschein & Co. 3s. 6d.)

## TRADE CATALOGUES.

THE Weber Steel-Concrete Chimney Company send us a little pamphlet containing a brief description of the Weber chimney, and several photographic views of such chimneys under construction and completed in the United States. The method of construction is illustrated by a view on the first page showing the vertical bars of the reinforcement and two rings of moulds in position for deposition of the concrete, which, being composed entirely of Portland cement and sand, would be more correctly termed cement mortar. The valuable properties of reinforced cement and concrete in respect of resistance to atmospheric action, heat, and the products of combustion are well known, and, owing to its capacity for resisting tension, the material lends itself to the design of chimneys on much smaller areas than would be required for brick or brick-lined steel chimneys of the same height and diameter. As the weight of these chimneys is relatively light, they are particularly suitable for places were the soil has low bearing power, and even on more stable ground the cost of foundations is reduced by the smaller pressures involved. The monolithic character of the work, the smoothness and airtightness of the flue, and the rapidity with which construction can be conducted are other points worthy of note. We quite agree with the suggestion in the pamphlet that elegant and graceful outlines may be obtained by the employment of reinforced cement, but it can scarcely be admitted that the light grey colour of cement adds to the artistic effect of any structure.

Messrs. R. Waygood & Co. send us a new 8-pp. catalogue they have issued on the subject of lifts and cranes. This publication contains typical illustrations of the hydraulic, electric, and hand lifts manufactured by the firm, and appears to be one of those auxiliary circulars intended to awaken the desire on the part of recipients to obtain the complete general catalogue, in which more complete particulars are given of lifting and hoisting machinery. The views here presented are certainly calculated to arouse the interest of intending purchasers.

Messrs. M'Tear & Co. (Belfast) have sent us an account of their asphalt roofing felts, etc., with illustrations of light bow-string and other roofs, and a detailed price-list.

We have received from Messrs. Adamsez (Scotswood-on-Tyne) illustrations of Adams's patent lavatory and "Krator" sink and bowl. The lavatory, which would have been all the better without the ornamentation, is hinged at one end to a plate attached to the wall, and can be swung out as required; it is designed for fixing over a bath or water-closet, and the waste water is discharged into the fitting below. The "Krator" sink is a shallow, rectangular sink with a circular bowl at one end fitted with a plug and chain, and will probably prove useful in small houses.

An illustrated sheet has been sent to us by the Falcon Brass Works, containing sections and elevation of Fretwell's patent adjustable junction and tee-piece for lead and iron waste and soil pipes. The junction is cleverly designed so that the branch may enter at various angles, and at the same time the joint allows for expansion and contraction. Screwed sockets and special holder-bats are also shown for use with screwed wrought-iron tubing.

Messrs. E. Busby & Co. have sent us particulars of their valve fittings for public baths. These are of the combination type, and can be operated inside or outside the bathroom. They are specially made to facilitate repairs to the seatings, and it is a distinct advantage that the parts are interchangeable. The valves are also made with a connexion for a shower fitting.

Messrs. Alfred Walker & Sons (Leeds) have sent us a twenty-four-page catalogue containing a long list of buildings and premises in which their concrete pavings and floors and artificial stone have been used. Four pages only are devoted to illustrations and descriptions, and at least one of the illustrations might with advantage have been omitted, as the iron joists shown in it are of an obsolete type. The pavings are made with an aggregate of either crushed granite or slag.

A small catalogue from Messrs. G. Tucker & Son (Loughborough) contains coloured illustrations of the moulded and ornamental bricks, ridge-tiles, chimney-pots, etc., manufactured by the firm. There is a good selection of moulded bricks in 3-in. and 4½-in. sizes.

# The Student's Column.

## SOME MATHEMATICAL METHODS AND USEFUL DATA FOR ARCHITECTS.—VIII.

SIMPLE METHODS OF PROVING CALCULATIONS.

AMONG the various methods of testing the accuracy of calculations involving addition, multiplication, and division, the following are the most expeditious, although it should be recognised that they do not serve to detect errors of working which are mutually counteractive.

### *To Prove Addition.*

*Rule.*—Add together the individual figures of each addend, and add together the individual figures of each sum. Then, adding together the last obtained sums and also the individual figures of their sum, the result is an *index number*, which is also the sum of the individual figures in the sum of the addends.

***Example*** (1): Prove the accuracy of the sum (867,213 + 123,841 + 32,642 + 943,845 + 65,736 + 47,314 + 1,237,492) = 3,318,083.

Adding the individual figures of each addend and of the sum of each addend, we get

(8 + 6 + 7 + 2 + 1 + 3) = 27, and (2 + 7) = 9
(1 + 2 + 3 + 8 + 4 + 1) = 19, and (1 + 9) = 10
(3 + 2 + 6 + 4 + 2) = 17, and (1 + 7) = 8
(9 + 4 + 3 + 8 + 4 + 5) = 33, and (3 + 3) = 6
(6 + 5 + 7 + 3 + 6) = 27, and (2 + 7) = 9
(4 + 7 + 3 + 1 + 4) = 19, and (1 + 9) = 10
(1 + 2 + 3 + 7 + 4 + 9 + 2) = 28, and (2 + 8) = 10

Adding together the last obtained sums, we have

(9 + 10 + 8 + 6 + 9 + 10 + 10) = 62,
and (6 + 2) = 8, which is the index number.

Adding the individual figures in the sum of the addends we have

(3 + 3 + 1 + 8 + 0 + 8 + 3) = 26,

and

(2 + 6) = 8.

As this result agrees with the index number found before, we may presume the addition has been correctly performed.

***Example*** (2): Prove the accuracy of the sum (345 + 136 + 427 + 286) = 1,194.

Proceeding as before, we have

(3 + 4 + 5) = 12, and (1 + 2) = 3
(1 + 3 + 6) = 10, and (1 + 0) = 1
(4 + 2 + 7) = 13, and (1 + 3) = 4
(2 + 8 + 6) = 16, and (1 + 6) = 7

The sum of (3 + 1 + 4 + 7) = 15, and (1 + 5) = 6, which is the index number.

As the individual figures of the sum of the addends (1 + 1 + 9 + 4) = 15, and (1 + 5) = 6, we have evidence that the addition is correct.

***Example*** (3): Prove the accuracy of the sum (226·443 + 45·86 + 22·621 + 9·874) = 304·798.

Here we have

(2 + 2 + 6 + 4 + 4 + 3) = 21, and (2 + 1) = 3
(4 + 5 + 8 + 6) = 23, and (2 + 3) = 5
(2 + 2 + 6 + 2 + 1) = 13, and (1 + 3) = 4
(9 + 8 + 7 + 4) = 28, and (2 + 8) = 10

Then, as (3 + 5 + 4 + 10) = 22, the index number is 4.

Similarly

(3 + 0 + 4 + 7 + 9 + 8) = 31,
and (3 + 1) = 4.

### *To Prove Multiplication.*

*Rule* (1).—The sum of the individual figures in the product of any number multiplied by 9, or by any multiple of 9, will give the *index number* 9 when the individual figures of the sum are added together.

***Example*** (1): Prove the accuracy of the product (786,957 × 9) = 7,082,613.

Here

(7 + 0 + 8 + 2 + 6 + 1 + 3) = 27,
and (2 + 7) = 9, the index number.

***Example*** (2): Prove the accuracy of the product (645 328 × 63) = 40,655,664. (In this example the multipher = 9 × 7.)

Here

(4 + 0 + 6 + 5 + 5 + 6 + 6 + 4) = 36,
and (3 + 6) = 9, the index number.

***Example*** (3): Prove the accuracy of the product (327,865 × 45,927) = 15,057,855,855. (In this example the multiplier = 9 × 5,103.)

Here

(1 + 5 + 0 + 5 + 7 + 8 + 5 + 5 + 8 + 5 + 5) = 54
and (5 + 4) = 9, the index number.

*Rule* (2).—The sum of the individual figures of any multiple of any number which is a multiple of 9, or the sum of whose individual figures is 9 or a multiple of 9, gives the *index number* 9 when the individual figures of the sum are added together.

***Example*** (4): Prove the accuracy of the product (1,372,896 × 5,253) = 7,211,822,688. (In this example the multiplicand = 9 × 152,544; the sum of its individual figures being (1 + 3 + 7 + 2 + 8 + 9 + 6) = 36, and (3 + 6) = 9.)

Here the sum of the figures in the multiple is

(7 + 2 + 1 + 1 + 8 + 2 + 2 + 6 + 8 + 8) = 45,
and (4 + 5) = 9, the index number.

***Example*** (5): Prove the accuracy of the product (45,927 × 522) = 23,973,894. (In this example the multiplicand = 9 × 5,103; the sum of its individual figures being (4 + 5 + 9 + 2 + 7) = 27, and (2 + 7) = 9.)

Here the sum of the figures in the product or multiple is

(2 + 3 + 9 + 7 + 3 + 8 + 9 + 4) = 45,
and (4 + 5) = 9, the index number.

*Rule* (3).—Divide by 9 the multiplicand and the multiplier, and divide by 9 the product of the remainders so obtained; then the final remainder should be the same as that obtained by dividing by 9 the product of the multiplicand and the multiplier.

***Example*** (6): Prove the accuracy of the product (84,362 × 7,538) = 635,920,756.

Here the multiplicand 84,362 divided by 9 gives 5 as remainder, and the multiplier 7,538 divided by 9 gives 5 as remainder.

Then the product of the remainders (5 × 5) divided by 9 gives 7 as the final remainder.

Next, dividing by 9 the product of the multiplicand and multiplier (635,920,756 ÷ 9), we get 7 as remainder.

As the remainders are equal it is assumed the multiplication has been correctly performed.

***Example*** (7): Prove the accuracy of the product (36½ × 54½) = 2,002½.

Here the multiplicand 36½ divided by 9 = 36·5 ÷ 9, gives 3 as remainder, and the multiplier 54½ divided by 9 = 54·5 ÷ 9, gives 5 as remainder.

Then the product of the remainders (3 × 5) divided by 9 gives 6 as the final remainder.

Next, dividing by 9 the product of the multiplicand and multiplier and expressing the fraction decimally, 2002·875 ÷ 9 gives 6 as the remainder.

Hence the product may be taken as correct.

As mentioned above, certain errors in multiplication are not invariably detected by means of the foregoing rules. For instance, two of the digits in the product may be in wrong order, or an equal amount may have been added to one digit and subtracted from another digit, or a cipher may have been inserted or omitted in error.

In example (6), if the first two figures of the product were incorrectly written to give 365,920,756, or if the individual products were incorrectly added to produce 635,820,766, or if an additional cipher were carelessly included, making the product read 6,359,200,756, the division by 9 would still

give 7 as remainder. But with ordinary care no errors are to be anticipated such as would leave the two remainders in agreement, and it would almost invariably be the case in practice that accidental errors of the kind would lead to an evident discrepancy between the remainders, and so point to the inaccuracy of the calculated product.

*Rule* (4).—Multiplication may also be proved by employing 11 as a test divisor in the same way that 9 is employed under rule (3).

The convenience of this test depends upon the principle that the remainder obtained after dividing any given number by 11 is the same as the difference between the sum of the individual figures in the odd places and of those in the even places of the product, commencing in each case at the right hand (*a*); or if the difference is more than 11, is the same as the remainder given after division of the difference by 11 (*b*). If the sum of the figures in the even places of the number should be greater than the sum of the figures in the odd places, then the latter must be increased by 11, or some multiple of 11, in order that the remainder shall be positive (*c*).

This explanation will be more readily understood by the following illustrations which are lettered to agree with the reference letters in the text above:—

(*a*) 465,678 ÷ 11 gives 4 as remainder, and $(8 + 6 + 6) - (7 + 5 + 4) = 4$.
(*b*) 463,709 ÷ 11 gives 4 as remainder, and $(9 + 7 + 6) - (0 + 3 + 4) + 11 = 4$.
(*c*) 435,081 ÷ 11 gives 9 as remainder, and $[(1 + 0 + 3) + 22] - (8 + 5 + 4) = 9$.

*Example* (8): Taking the same figures as in example (6) prove the accuracy of the product (84,362 × 7,538 = 635,920,756.

Here the multiplicand 84,362 divided by 11 gives 3 as remainder, and the multiplier 7,538 divided by 11 gives 3 as remainder.

Then the product of the remainders (3 × 3) = 9, which is the final remainder.

The difference between the sum of the figures in the odd and even places of the product commencing at the right hand is $[(6 + 7 + 2 + 5 + 6) - (5 + 0 + 9 + 3)] = (26 - 17) = 9$, which agrees with the final remainder ascertained.

*Example* (9): Taking the same figures as in example (7) prove the accuracy of the product ($36\frac{3}{4} \times 54\frac{1}{2} = 2002\frac{1}{4}$).

Using decimal fractions, the multiplicand 36·75 divided by 11 gives 1 as remainder, and the multiplier 54·4 divided by 11 gives 6 as remainder.

Then the product of the remainders (1 × 6) = 6, which is the final remainder.

Next, taking the difference between the sum of the figures in the odd and even places of the product (2002·875), we have

$$(5 + 8 + 0 + 2) - (7 + 2 + 0) = 15 - 9 = 6,$$

which agrees with the final remainder ascertained.

As in the case of rules (1), (2), and (3), test division by 11 will not reveal mutually counteractive errors.

*Note.*—A rough check upon the substantial accuracy of multiplication that may be sometimes applied with advantage in practical work is to multiply together numbers that are approximately equal in value to the actual numbers.

An approximate proof of the product (1,987 × 713) = 1,416,731 is given by taking 2 × 7 = 14, and adding the five ciphers required to give 1,400,000 as the test result.

Again, to test the product $(4\frac{1}{16} \times 2\frac{1}{8} \times 1\frac{1}{4}) = 19\frac{663}{1024}$, the approximation (5 × 2 × 2) = 20 shows that the original working cannot be far wrong.

Tests of this kind are useful to busy men in checking the practical accuracy of calculations made by assistants or pupils, who are apt to repose too much faith in the infallibility of their calculated results, and therefore do not think it possible that they may have placed a decimal point in the wrong position, or inadvertently misplaced some line of figures so as to lead to serious error. Those with more extended experience know that accidental slips will occur occasionally, and so upset the accuracy of calculations that in other respects are most carefully and correctly worked.

### *To Prove Division.*

*Rule* (1).—Divide by 9 the quotient and the divisor, and divide by 9 the product of the remainders so obtained; then the final remainder should be the same as that obtained after division of the dividend by 9.

*Example* (1): Prove the accuracy of the quotient (64,875 ÷ 375) = 173.

Here the quotient 173 divided by 9 gives 2 as remainder, and the divisor 375 divided by 9 gives 6 as remainder.

Then the product of the remainders (2 × 6) divided by 9 gives 3 as the final remainder.

Next, dividing the dividend (64,875) by 9 we get 3 as remainder. Hence the quotient can be taken as correct.

*Rule* (2).—In cases where division leaves a remainder, divide by 9 the integer of the quotient and the divisor, and to the product of the remainders so obtained add the remainder left after division of the original remainder by 9; divide the sum of these quantities by 9, and the final remainder should be equal to that obtained from the division of the dividend by 9.

*Example* (2): Prove the accuracy of the quotient $(843,657 \div 4,235) = 199\frac{292}{4235}$.

Here the integer of the quotient 199 divided by 9 gives 1 as remainder, the divisor 4,235 divided by 9 gives 5 as remainder, and the original remainder 892 divided by 9 gives 1 as remainder.

Then the product of the remainders (5 × 1) plus 1 = 6.

Next, dividing the dividend 843,657 by 9, we get 6 as remainder. As the two results agree the quotient $199\frac{292}{4235}$ is taken as correct.

*Rule* (3).—Division may also be proved by employing 11 as a test divisor in the same way that 9 is employed under rules (1) and (2).

*Example* (3): Taking the same figures as in example (1) prove the accuracy of the quotient (64,875 ÷ 375) = 173.

Here the quotient 173 divided by 11 gives 8 as remainder, and the divisor 375 divided by 11 gives 1 as remainder.

Then the product of the remainders (8 × 1) = 8, which is the final remainder.

Next, the difference between the sum of the figures in the odd and even places of the dividend is $(5+8+6) - (7 + 4) = 19 - 11 = 8$ as before, showing the correctness of the quotient.

*Example* (4): Taking the figures in example (2) prove the accuracy of the quotient: 843,657 ÷ 4,235 = $199\frac{292}{4235}$.

Here the integer of the quotient 199 divided by 11 gives 1 as remainder, the divisor 4,235 divided by 11 gives 0 as remainder, and the dividend 892 divided by 11 gives 1 as remainder.

Then the product of the remainders (0 × 1) plus 1 = 1.

Taking the difference between the sum of the figures in the odd and even places of the dividend, we get

$$(7 + 6 + 4) - (5 + 3 + 8) = 1.$$

So the quotient $199\frac{292}{4235}$ may be taken as correct.

*Example* (5): As the product of the remainders in the preceding examples are so small as to obviate the necessity for division by 11, we take in this example some larger figures.

Prove the accuracy of the quotient (6,497,280 ÷ 4,230) = 1,536.

Here the quotient 1,536 divided by 11 gives 7 as remainder, and the divisor 4,230 divided by 11 gives 6 as remainder.

Then the product of the remainders (7 × 6) ÷ 11 gives 9 as the final remainder.

Next, the difference between the sum of the figures in the odd and even places of the dividend, with the addition of 11 to the odd figures to give a positive result is

$$[(0 + 2 + 9 + 6) + 11] - (8 + 7 + 4) = 9.$$

Hence, the quotient may be taken as correct.

The inaccuracies that cannot be detected by this method are similar to those previously mentioned in connexion with rules (1) to (4) for proving multiplication.

## WESTMINSTER CITY COUNCIL.

THE usual fortnightly meeting of this Council was held on Thursday last week at the City Hall, Charing Cross-road, W.C.

*District Railway Sub-Station, Compensation for Use of Subsoil.*—The Works Committee reported having considered a letter from Messrs. Baxter & Co., on behalf of the Metropolitan District Railway, with reference to the compensation to be paid for the use of the sub-soil of Villiers-street for the construction of the Charing-Cross sub-station, stating that at the time the negotiations were opened with the City Council the company believed that the City Council were the owners of the subsoil, but that it now appeared that the subsoil was vested in the County Council, who had insisted upon the whole of the 1,700*l.* awarded by the arbitrator. In order to end the matter the company were prepared, without prejudice, to make a payment to the City Council of 200*l.* for any rights they might have in the sub-station site, the Council to accept in part payment the sum of 100*l.* deposited with them. In commenting on this letter the Committee stated that it was not the practice of Parliament when giving power to use the subsoil of a street for a station to allow compensation to the local authority, and although the subsoil of a public street was vested in the local authority for certain purposes, the London County Council in the present case had certain rights in the land. On the recommendation of the Committee it was agreed to accept the offer, the company to insert in their Bill before Parliament a clause authorising the arrangement.

*Projecting Clock in the Strand.*—The Council consented to the erection of a projecting clock at 125, Strand, the offices of the *Observer*.

*Piccadilly Widening.*—The Improvements Committee submitted a report dealing with this matter, in the course of which they dealt with a letter received from the London County Council enclosing a plan showing the extent of the widening and the sites of the pillars of the new arcade under the Ritz Hotel. It appeared that certain of the pillars stood on land acquired by the London County Council from the Building and Vendor Company, Ltd., and that other pillars were on the site of the old roadway or pavement. The company desired that the City Council should undertake, by signing the plan, not to interfere with any of the pillars there shown. On the recommendation of the Committee the City Engineer was authorised to sign the plan.

## *OBITUARY.*

M. DUTERT.—We regret to have to record the death, a few days ago, at the age of sixty, of M. Charles Louis Ferdinand Dutert, "Architecte Honoraire des Bâtiments Civils" under the French Government, and Honorary Inspector of Instruction in Drawing. M. Dutert was a pupil of Hippolyte Lebas and of M. Ginain, and obtained the Grand Prix de Rome in 1869. His name came prominently before the public in connexion with the immense Galerie des Machines for the 1889 Paris Exhibition, built from his design in co-operation with M. Contamin, a manufacturing engineer. M. Dutert was also the designer of the new galleries of the Natural History Museum, one of the most remarkable assemblages of buildings erected during recent years in Paris.

MR. KING.—The death, on February 24, at Bracondale, Pinner-road, Harrow, is announced of Mr. Zephaniah King, aged 71 years. Mr. King was senior partner of the firm of Messrs. Zephaniah King & Son, of No. 171, Victoria-street, Westminster. He was elected an Associate in 1881, and in 1887 a Fellow, of the Royal Institute of British Architects; he served as an honorary auditor to the Institute for the session 1899-1900. Mr. King was elected a member of the Architectural Association in 1864; in March, 1902, he was elected a member of the Council of the Architects' Benevolent Society, and retired by rotation in March of the next following year.

MR. GODMAN.—Mr. Ernest Godman died on February 15, at Sunnyside, Banstead, Surrey. Mr. Godman was Architect and Secretary of the Committee for the Survey of the Memorials of Greater London. He was the author of a work upon Norman and Mediæval architecture in Essex, and wrote additions to the Hon. Walter C. Pepys's illustrated account of the church of St. Dunstan, Stepney, which was brought out by the Essex House Press some fifteen months ago.

## *GENERAL BUILDING NEWS.*

BATH ABBEY RESTORATION.—At the Bath Guildhall recently a decision was come to as to the completion of the restoration of Bath Abbey. The executive committee reported upon the experiments which Mr. T. G. Jackson, R.A., had conducted with a view to enabling them to advise upon the question whether there should be pinnacles on the tower. They supported Mr. Jackson's opinion that the tower was intended to have spirets, and recommended that four pinnacles be erected on the tower with two to correspond at the east end. Colonel Clutterbuck (treasurer) reported that the four tower pinnacles would cost 1,398*l.*, the two at the east end 556*l.*, and in addition there was general repair work necessary to the amount of 199*l.* On the motion of the Bishop of Bath and Wells, it was resolved that Mr. Jackson's proposed pinnacles, with the addition of metal flags, should be adopted for the tower, and also as the model for proportionately smaller pinnacles for the east end.

CHURCH RESTORATION, DAUNTSEY, WILTS.—The work of restoration which has been proceeding at the ancient Parish Church at Dauntsey has just been completed. The nave and two aisle roofs, and also the roof of the Danby Chapel, have been renewed, and the floors repaved with York stone. The walls and porch have been renovated and a new pulpit erected in the same style as the old oak pews, which have been retained and restored. The cost has amounted to 800*l.*, and Mr. H. Brakspear, architect, had charge of the work.

CATHOLIC CHURCH, PORTOBELLO, N.B.—The new Catholic church in Brighton-place, Portobello, has a sanctuary and nave with apsidal end measuring 112 ft. long, including the aisles, with chapels on each side. The design is by Mr. J. T. Walford, architect. At the west end, fronting Brighton-place, is a baptistry with groined roof. In the north aisle is a sacristy and four confessionals. The exterior is of Auchenheath stone with facings of rubble Winchburgh stone, the interior being treated with stone from the Grange Quarry, Fife. Accommodation is provided for a congregation of 900. The sanctuary at the east end of the building is paved with terrazza marble, as also are the halls and passages, the altar steps being of Sicilian marble. The arcade columns on the north have carved capitals, and the chancel has decorations of angels. Cathedral glass is used throughout, and there is a scheme of electric light. The tower reaches 112 ft. high—its cross raised 152 ft. from the street.

PAMPHILL CHURCH, DORSET.—The foundation-

stone of this church has just been laid. The architect is Mr. C. E. Ponting, F.S.A., the diocesan architect, of Marlborough, and the work of construction has been placed in the hands of Messrs. Hoskings Bros., of Newbury, Berks. The church will be cruciform, and built in the late Decorated style. It will be 93 ft. long by 26 ft. wide, and consist of a nave, chancel, north and south transepts, and a western tower 40 ft. high. The space under the tower will be occupied by the family pew, to which there will be a private entrance on the north side of the tower. The south transept will be used by the school children, who will have a separate entrance, whilst the north transept will form the vestry with organ loft over it. The main entrance to the building will be by a porch on the south side, which faces Pamphill Green. Seating accommodation will be provided for 193 persons. The roof will be of open timber work covered with dark tiles, the timber being oak, and the flooring will be of wood blocks. The seats will be also of open oak work, and it is expected the chancel will be paved with marble. The eight large tracery windows of the nave and transepts, filled with cathedral glass, will be supplemented by a six-light window at the back of the family pew in the tower wall, whilst the window at the east end of the chancel will be a five-light one and extend nearly the whole width.

CHURCH IMPROVEMENT, CALLANDER, N.B.—A meeting of the congregation of the United Free Church was recently held to hear the report of the special committee upon the proposals of the deacons' court for the improvement of the church buildings. The report stated that the committee were unanimously agreed in recommending in its main features the plans and proposals prepared by Messrs. Stewart & Paterson, architects, Glasgow. The alterations which it was decided to carry out include the transferring of the organ from the north to the south side of the chancel, the enlargement of the chancel eastwards to the extent of 3 ft., and the altering of the position of the new vestry.

VESTRY AND ORGAN, DOWLAIS CHURCH.—Since the enlargement, some years ago, of St. John's Parish Church, Dowlais, it had been felt that the old organ was inadequate to the needs of the present congregation of worshippers. A contract was, therefore, entered into with Messrs. Norman & Beard to erect a three-manual instrument to specifications prepared by Mr. Harry Evans, Dowlais, and Mr. W. J. Watkins. It became necessary to enlarge the old organ-chamber, the work being entrusted to Mr. Enoch Williams, builder, Dowlais. A new vestry has been added on the north side of the chancel, the architect of the whole of the alterations being Mr. E. M. Bruce-Vaughan, Cardiff.

SCHOOL, NEWHALL, SHEFFIELD.—Alderman Clegg, the Chairman of the Sheffield Education Committee, presided on the 12th ult. at the opening of the new school at Newhall for defective children. The new building has been specially designed by the architect, Mr. A. F. Watson (Messrs. Holmes & Watson), to embrace a department for teaching defective children. It comprises on the ground floor three class-rooms, each accommodating twenty children, a hall, in which exercises or marching will be taught, and private rooms for the teachers. An area of ten superficial feet is allowed for each child. The upper floor will be utilised as a cookery and manual training centre, each department being for upwards of forty scholars. The manual department is fitted up with wood and other stores, as well as with cupboards for the pupils' work, while the cookery classroom has pantry and scullery accommodation.

SCHOOL, WARRINGTON.—The foundation-stone of the new "Beaumont" Council school in Orford-avenue, Warrington, was laid on the 9th ult. The school buildings are situated on a site of about 2½ acres, and have been arranged in five blocks. There will be a two-story building, which will give accommodation for 360 girls on the ground floor and 360 boys on the first floor. In another building accommodation will be provided for 360 infants, and there will also be a cookery and manual instruction block. Large covered play-sheds have been arranged in each yard, and running along the entire length of one side of the site a garden for nature study has been provided. The building will be heated with hot water on the low-pressure principle, with radiators. The work is being carried out from the designs and instructions of Mr. S. P. Silcock, architect, Warrington. The builder is Mr. C. W. Davenport, of Stockton Heath, and Mr. Henry Hallard is superintending the work. The cost of the building will amount to nearly 16,000*l*.

HOSPITAL FOR SICK CHILDREN, GREAT ORMOND-STREET.—The top floor of the south wing of this hospital, erected in 1890, has recently been converted into an isolation department for infectious cases. The old timber roof has been removed, and a new steel roof, with an asphalt flat laid thereon, has been added. This new roof is formed of two layers of "Mack" slabs—having an air space between—fixed to the steel work, and the asphalt is laid directly on the slabs. The flat is enclosed on three sides with a wrought-iron railing, 6 ft. high, and on the north side by a brick wall. The flat is to be used for the open air treatment of consumptive patients. The accommodation provided consists of four single bed wards, one ward for two beds, two nurses' rooms, kitchen, and sanitary annexe. The partitions have been formed with "Mack" slabs, the asphalting has been executed by the Val de Travers Asphalting Company, the doors by the Gilmour Door Company, Ltd., and the constructional steelwork by the Barry Transporter and Engineering Company. The additions, including the joinery—which is constructed throughout in teak—have been executed by the Works Department of the Hospital, under the management of Mr. James McKay. The architect is Mr. Charles E. Barry.

RECEPTION HOUSE, PARTICK, N.B.—The reception house at Knightswood Hospital was opened on the 13th ult. The building is of one story, and is designed in such a manner that from a central administrative department there radiates four different houses, which can be occupied by four different families. Each house has a living-room, two bedrooms, and a bathroom, having an independent entrance door and airing ground. One of the houses, instead of having two bedrooms has one dormitory, and this house can be utilised, if required, for the accommodation of men only. The administrative department is placed in the centre of the building and from the central kitchen an entrance is provided to each house with a sliding shutter for the service of food to the inmates. The administrative department consists of a large kitchen, with sculleries and all necessary store-rooms, while at the back three apartments are provided for the accommodation of nurses and servants. A special entrance is provided from the main road to this department. Heating is partly by hot-water pipes and radiators. Electric light is fitted throughout. The whole cost of the work will be about 2,500*l*. The buildings were designed by Messrs. H. & D. Barclay, Glasgow, and the work carried out under the superintendence of Mr. John Bryce, master of works.

PROPOSED WATT MEMORIAL, GREENOCK.—A meeting of the committee in charge of the Watt Memorial Fund at Greenock met on the 8th ult., and resolved to proceed with the erection of a building upon the site of James Watt's birthplace, at the corner of William-street and Dalrymple-street. Mr. Colin MacCulloch, acting secretary, submitted the report of the sub-committee, which embraced proceedings since the beginning of the movement. It was stated that the Greenock Corporation had unanimously agreed to place the site of Watt's birthplace at the disposal of the committee, the members of which called in Mr. David Barclay, of Messrs. H. & D. Barclay, Glasgow, the architect of Greenock Municipal Buildings, who prepared four sets of plans. Provost Denholm, in explanation of these plans, stated that the committee had unanimously agreed to recommend plan No. 3, which showed a building in the old Scots style of architecture, at an estimated cost of 6,500*l*. On the motion of ex-Bailie Maconie, seconded by Mr. John Rankin, the report was adopted, and it was remitted with full power to the committee to carry out.

PROPOSED EXTENSION OF THE INFECTIOUS DISEASES HOSPITAL, LINCOLN.—Mr. J. Spencer Low, M.B., Local Government Board Inspector, held an inquiry recently at the Guildhall, Lincoln, into the application of the City Council for sanction to borrow the sum of 2,200*l*. for the extension of the Infectious Diseases Hospital. Mr. W. T. Page, jun., the Deputy-Town Clerk, stated that it was proposed to build two public wards, for the accommodation of eight beds each, and two private wards of one bed each. At the request of the Inspector, the Surveyor produced the plans, and explained the nature of the proposed extension, stating that the new block would be practically on the same lines as the present one. The buildings would be of brick and York stone.

NEW HALL, BALGONIE, N.B.—The new hall which has been presented to the inhabitants of Coaltown of Balgonie and district by Mr. C. B. Balfour of Balgonie, M.P., was opened on the 14th ult. The structure, which stands in the village of Coaltown, is designed after the English Renaissance style, and is constructed of terra-cotta brick, with green slates and projecting roofs, having large boards at the gables. The heating is done on the low-pressure steam system by means of radiators, the boiler being in a sunk fireproof chamber. The cost has been about 3,000*l*. Messrs. Gillespie & Scott, St. Andrews, were the architects of the hall, and the following were the contractors:—Mason and brick work, Messrs. Wilkie & Gibb, Leven; joiner work, Mr. John Mitchell, Coaltown of Balgonie; slater work, Mr. Thomas Black, St. Andrews; plumber work, Mr. William Spittal, Markinch; plaster work, Mr. Thomas Davidson, Markinch; painter work, Mrs. Allan, Markinch; heating, Messrs. A. L. Peacock & Co., Dundee; gates and railings, Mr. David Houston, Cupar; laying out of the grounds, Mr. Archibald Douglas, Cupar; furnishings, Mr. David Grieve and Mr. M'Nab, Markinch.

GIRLS' SECONDARY SCHOOL, FOLKESTONE.—Pelham House, Bouverie-road East, Folkestone, has just been opened as a secondary school for girls. The necessary alterations and repairs were carried out by Mr. S. Binfield, according to the plans, and under the direction, of Mr. W. H. Robinson, Architect to the Kent Education Committee. In all there are six classrooms, providing accommodation for 150 students.

HOSPITAL EXTENSION, BIRMINGHAM.—The Queen's Hospital at Birmingham is to be enlarged at a cost of 30,000*l*. Plans have been prepared by Messrs. Ewen Harper & Bro. for a three-story structure, which will afford accommodation for sixty beds. The plan shows buildings running north and south from Bath-row, with projections to the south at either end. On the ground floor will be a physician's room near the entrance, and more to the rear residential quarters for the superintendent of the hospital, which at present the institution does not posse s; a students' day-room, cloak-room for lady students, and a new chapel, 36 ft. by 16 ft. On the first floor is shown a male ward 120 ft. by 24 ft., with room for thirty beds, but this will be divided into two wards. Associated with them will be three bathrooms, a clinical room, two small wards for special cases, a ward kitchen, and store. At the front, over the entrance, will be an open balcony. On the second floor the front portion is appropriated to a children's ward, with six beds, and a women's ward, with twenty-four. A covered glass corridor running behind the out-patient departments will form the means of communication between the older portion of the hospital and the new. The consulting-rooms on either side of the out-patient hall are deficient in space, and to remedy this it is proposed to add upon each side a lean-to structure, providing an additional dressing or examination-room to each consulting-room. The nurses' home is also to be enlarged by the provision of fourteen additional bedrooms, a nurses' recreation-room, and a sitting-room for the lady superintendent.

WORKHOUSE LAUNDRY, TRANMERE.—The laundry erected at the Tranmere Workhouse by the Birkenhead Guardians was opened a short time ago. The plant consists of boiler-house, engine-room, wash-house, and ironing room, separated from one another by drying closets (common to which are receiving, delivery, or dispatch rooms), and adjoining a small wash-house for special purposes. There is a chimney 120 ft. high on the north side of the boiler, and for the sake of security the foundations were carried down to the solid rock 18 ft. below the surface. The buildings are of common brick with red brick dressings, but inside the laundry is lined with white glazed bricks of second quality. The floors are granolitic and of wood. Light and ventilation have been carefully attended to, the windows containing opening casements top and bottom, and exhaust ventilating fans being placed in the roofs and driven at a high speed by steam power. Mr. Edmund Kirby was the architect of the work.

PROPOSED MISSION HALL, PORTOBELLO, EDINBURGH.—A new mission hall is to be erected in connexion with St. Mark's Church, Portobello. Mr. Edward C. H. Maidman, architect, of Edinburgh, has prepared the plans for the proposed work.

## *STAINED GLASS AND DECORATION.*

BUCKERELL CHURCH, HONITON.—A memorial tablet has recently been placed in this church to the memory of the late vicar. The plate is of brass richly decorated and enamelled, surmounted with repoussé silver figures representing angels, supporting a gold chalice, while at each corner of the brass are massive solid silver and enamelled studs. The whole is set in a moulded black marble frame and supported by carved Devonshire marble corbels, each bearing a sacred monogram. The design is by Mr. John Medland, architect, and the work was executed by Messrs. Keith & Co.

CHRIST CHURCH, SOUTHGATE.—The new side chapel, at Christ Church, Southgate, has been entirely redecorated by Messrs. Percy Bacon & Brothers; the roof in colours and emblems; the walls diapered; and five pictures in oils painted by Mr. Percy Bacon himself. The subjects of these pictures are "The Annunciation," "Nativity," "Epiphany," "Presentation," and the "Doctors in the Temple."

WINDOW, CATHOLIC CHURCH, SHEPHERD'S BUSH.—The east window of the Catholic Church of The Holy Ghost and S. Stephen, Shepherd's Bush, has just been filled with stained glass. The window is formed of four large quatrefoils with spandrils. In the upper portions are angels bearing a scroll. In the lower portions are ten figures of saints with their respective emblems. The glass is rich and deep in colour—to suit the unusually strong light. The window was designed and executed by Mr. E. Stanley Watkins, of Ealing.

## *SANITARY AND ENGINEERING NEWS.*

WATERWORKS, EAST COWES.—The newly-constructed waterworks at East Cowes were opened on the 22nd ult. The water-tower is

brick built, starting with walls 2 ft. thick, and tied together at every floor with circular arches and steel girders. The tank, which rests on a floor of steel girders 12 in. deep, is 21 ft. square and 11 ft. deep. The cost, including plant, has been over 6,000*l*. Mr. W. Brown was the District Council's consulting engineer.

NEWCASTLE QUAY-WALL EXTENSION.—The Newcastle Corporation have decided that the City Engineer shall carry out the extensions of the quay wall, and not to let the work on contract.

VENTILATION OF THE SIMPLON TUNNEL.—So far as can be judged the ventilation of the Simplon tunnel, which is now practically complete, ought to be satisfactory as regards hygienic conditions and the comfort of passengers. When the ventilating apparatus has been installed in full it will consist of a pair of stout canvas curtains at each entrance, the material secured to iron frames mounted on rollers and operated by electric motors, and powerful fans at each end of the tunnel driven by turbines. The curtains will have to be raised each time a train enters or leaves the tunnel, and their object is to prevent any interference with the positive action of the air propelling machinery. The fans at the north entrance will force in about 2,430 cubic feet of fresh air per second, and those at the south entrance with a similar capacity will act as exhaust fans, thus materially aiding the movement of air along the underground route. As there will be no disturbing causes such as those which make the ventilation of London tube railways so difficult, it is probable that the results will come up to the expectations of the engineers and that the temperature will not exceed reasonable limits.

## *FOREIGN.*

FRANCE.—It is announced that Mr. Hayes, a rich American living in Paris, has offered to the city a statue of Benjamin Franklin, which is to be set up in April.——Fourteen fine Gobelin tapestries are shortly to be exhibited at Versailles; they are works executed in the reign of Louis XIV. from the designs of Lebrun and Van der Meulen. Among the subjects are, the Duke of Anjou proclaimed King of Spain, the departure of Turenne for the war, the siege of Douai, etc. ——The Municipality of Bordeaux have under consideration a large scheme for an increase to the water supply of the city, at an estimated cost of 4½ million francs.——The ancient theatre of Orange, well known as one of the finest remains of Roman architecture in France, is threatened with a complete "restoration," which would probably be as deplorable in its results as all the works of this kind that have been undertaken in France for some years past. It is proposed to lay out half a million francs on this work.—— The jury in the competition opened by the Municipality of Marseilles for the reconstruction of the insanitary neighbourhood in the rear of the Bourse, has awarded the first premium to MM. Hélrard and Ramasso, architects who hold scholarships from Marseilles at the Ecole des Beaux-Arts at Paris, and the second to M. Tony Garnier, a Government architect and former Prix de Rome.——There is again talk of rebuilding the Mairie of the Eighth Arrondissement on its present site in the Rue d'Anjou. The work will be entrusted to M. Nénot. The cost is estimated at 2 million francs.——The death is announced, at the age of sixty, of M. Ernest Paugoy, architect, of Marseilles, and a member of the Société Centrale.——The death is announced, at Avignon, at the age of eighty-two, of an able artist, Pierre Grivolas, Director of the Art-schools of that town. He was known as a painter of flowers, rural scenes, and of the landscape of Provence. He had presented to the Museum at Avignon a considerable number of his pictures.——The death is announced of M. Auguste Fleury, the oldest architect of Rouen, at the age of eighty-two.——When the budget for Fine Arts comes under discussion in Parliament, the question is to be considered of building four popular theatres in Paris, one in the centre and the others in three of the outlying arrondissements, such as Montmartre, La Villette, Les Gobelins, or Grenelle. The cost of the whole scheme is estimated at nearly 4,000,000 francs. ——Mdme. Bartholdi, the widow of the late sculptor, has founded a prize to be awarded annually, at the Old Salon, to an artist who has executed any work remarkable for qualities of invention and imagination, in any walk of art. The prize will be awarded this year for the first time.——It is probable that the monument to Carpeaux will be erected in the square of the Louvre, behind the Gambetta monument.—— Work is shortly to be commenced for the enlargement of the Mairie of the IInd arrondissement of Paris, in the Rue de la Banque.——A new district hospital is to be built at Rainey.——The Curator of the Palace of Fontainebleau has restored several of the ancient apartments, among them that formerly occupied by Pope Pius II., and those of the Princesse Hortense and of the sisters of Napoléon.——An international exhibition of Women's Art ("Arts de la Femme") is to be held at Marseilles in the course of the present year.——M. Gervais, architect, of Bordeaux, has been appointed architect to the Department of the Gironde.——The Municipality of Nancy has voted a sum of nearly 2,000,000 francs for various works of street improvement and building, including the erection of a district School of Art.——The Municipal Council of Agen have opened a competition for the building of a new theatre on the site of the existing theatre, which is to be demolished.——M. Durel, an architect, originally of Lyons, was murdered in a railway carriage a few days ago. He had designed the Kursaal and various hotels at Geneva, also the monument erected there to the French inhabitants who fell in the war of 1870.——The death is announced of M. Henri Hamel, art critic, and editor of the *Journal des Artistes*. He devoted himself in the first instance to painting and lithography, and was a pupil of Gérôme and of Maillart; he subsequently devoted himself to literature and started successively the *Monde Moderne*, the *Revue des Beaux-Arts*, and the *Revue Parisienne*. He was the author of two books—"Art et Critique" and "Causerie sur l'Art et les Artistes."

SOUTH AFRICA.—Messrs. Wilkie & Hutcheson, of Umtali, have secured the contract for building the Odzani power station and other buildings in connexion therewith.——The Transvaal Public Works Department has accepted Mr. J. J. Kirkness's tender for the erection of additional stories to the new Government buildings in Pretoria at a cost of 2,429*l*.

## *MISCELLANEOUS.*

THE INSTITUTE OF ARCHITECTS.—The Registration Sub-Committee, consisting of the President, Sir Aston Webb, R.A., Mr. Edwin T. Hall, Mr. T. E. Collcutt, Mr. John Slater, Mr. J. S. Gibson, Mr. A. W. S. Cross, Mr. W. H. Seth-Smith, and Mr. George Hubbard, and appointed by the Registration Committee "to take evidence for and against the principle of Registration, and to suggest the course of procedure to be adopted at the general meeting when the present scheme of registration comes up for discussion," desire to state for the information of members that they have held twelve meetings and taken the *viva voce* evidence of twenty-one architects practising in London and the provinces, a verbatim report of which has been preserved, and they hope soon to be in a position to report to the Registration Committee.

CHURCH OF ST. PAUL, BALL'S POND, ISLINGTON.—In terms of the Act 29-30 Vict. c. 111 the Ecclesiastical Commissioners have agreed to appropriate out of their common fund a grant of 650*l*. in supplement of a benefaction of the same amount which has been paid to them in favour of St. Paul's Church. The total sum of 1,300*l*. is to be applied to the provision of a parsonage or house of residence for the vicarage, according to plans and a specification to be approved by the Commissioners. The church, which stands at the junction of Essex and Ball's Pond roads, was built of brick with stone dressings and window tracery in 1826-7 after Sir Charles Barry's designs in the late Gothic style then in vogue.

WESLEYAN CHAPEL COMMITTEE'S REPORT.—The fifty-first annual report of the Committee which was recently issued sets forth that during the period under review 483 new or enlarged buildings were completed at an aggregate cost of 692,533*l*., the list including 133 new churches having a total capacity for 43,000 persons, 34 ministers' houses, 55 school-rooms, 203 improvements and extensions, and 58 organs. The building is in progress of 27 out of the 60 new churches for 16,700 sittings, sanctioned during the twelve months by the Committee. Mission halls have been erected at Hull, Bootle, and Plumstead, together with the Garrett Memorial hall, the headquarters of the Wesleyan mission in Liverpool; new central halls will shortly be built in Sheffield, Wigan, Paisley, Manchester, Sydenham, Stepney, and Great Queen-street, London. During the past fifty years the value of the chapel property belonging to the Connexion has increased by 10,000,000*l*., and an amount of 2,863,509*l*. has been paid off as debt upon Wesleyan trust property.

GALLERY OF BRITISH ART, MILLBANK.—Hogarth's "A Family Group" has become the property of the Gallery in terms of the late Mrs. Anne Sealy's will, and will be removed from the collection in Trafalgar-square. Recent additions to the Gallery at Millbank consist of a series of fifty drawings and sketches by Alfred Stevens, purchased by the trustees; G. F. Watts's "Echo," presented by Mrs. Watts; the late H. H. Armstead's bas-relief, "Hero and Leander," bequeathed by the artist; and Mr. Sargent's "Portrait of Miss Ellen Terry as Lady Macbeth," presented to the Gallery by Mr. J. J. Duveen.

THE MUNICIPAL YEAR BOOK.—The Municipal Year Book of the United Kingdom for 1906 has just been issued by Edward Lloyd, Ltd. (Salisbury-square). The work, which is edited by Mr. Robert Donald, is crowded with useful and, so far as we have been able to test it, reliable information relating to the cities and towns of the country, all of which is clearly arranged and printed. A brief general review is given of the work of each local authority in alphabetical order, under the name of the city, town, or district, and the chief sections into which the book is divided are as follows:—(1) London Municipal Government (County Council, City Corporation, Borough Councils, Water Board, Asylums Board, etc., etc.). (2) Municipal Government in England and Wales (general summaries of the work of the Municipal Corporations, Urban District Councils, and Rural District Councils). (3) Municipal Government in Scotland (general summaries of the work of the principal Scotch cities and towns). (4) Local Government in Ireland (general summaries of the work of the principal Irish cities and towns). (5) Water supply. (6) Gas supply. (7) Tramways. (8) Electricity supply. (9) Housing of the working classes. (10) Markets and slaughter-houses. (11) Telephones. (12) Baths and wash-houses. (13) Education. (14) Libraries. (15) Cemeteries. (16) Refuse and sewage disposal. (17) Local taxation returns, and (18) Municipal trading. There is also a directory of the principal societies and organisations connected with the various branches of local government. We have pleasure in drawing attention to a most useful guide to municipal work.

STREET IMPROVEMENT, NEWCASTLE.—A special meeting of the Town Improvement and Streets Committee of the Newcastle Corporation was held on the 19th ult., at the Town Hall, Newcastle, to consider a scheme proposed by the City Engineer (Mr. C. R. S. Kirkpatrick) for making a further extension of Market-street to Trafalgar-street. The City Engineer said that the scheme as sanctioned by Parliament could be improved upon in many respects. The levels of the main street would be very irregular, and the gradient of the cross streets would in some cases be very steep. The façades of the new street would never have more than the appearance of a succession of street ends. To cope with these difficulties he (the City Engineer) had prepared a scheme which, although it would cause further delay and expenditure, would in the end give satisfaction in the matter of gradients, frontages, and land available for sale. Market-street extension by this scheme would have one uniform gradient of 1 in 79 from Pilgrim-street to Trafalgar-street. The difficulties with cross streets would be avoided, and instead of a succession of street-ends there would be excellent frontages with a good depth of site that would make the land marketable. After going into details of the widths and gradients of the proposed new streets, with the length of the building-frontages of each, the report stated that the extra land required to be purchased represented an area of 12,400 sq. yds., which, together with that already purchased, made an area of 21,550 sq. yds. From this area, 7,100 sq. yds. would be required for streets, leaving a balance of 14,450 sq. yds., to which must be added 3,600 sq. yds. absorbed from streets which would be abolished, making a total of 18,050 yds. for re-sale. The land already purchased had cost about 183,000*l*., and it was estimated that the land required would cost about 248,000*l*., and that the land for sale would realise 601,820*l*., which, after deducting 22,000*l*. for street formation, and 25,000*l*. for other expenses, would leave a profit of 123,820*l*. After consideration it was agreed to make a survey of the lands in question on March 5.

SURVEYORSHIP, ST. GERMANS.—The St. Germans Rural District Council have appointed Mr. H. A. Hoskings their surveyor. There were ninety-nine applicants for the post.

SLATE TRADE.—There is an improvement in the Carnarvonshire district. It was found that prices in the January list for 24 by 12 to 22 by 11 were too low, so an advance has been made in those sizes. The wet weather has caused falls of rock in some of the deeper quarries; these, with the increasing cost of working, are turning the attention of quarry owners to the slate properties on the south side of the valley, which have always been highly thought of by the workmen. The men have accepted the reduction in wages, and work is being carried on smoothly in all the quarries.

THE COCKBURN ASSOCIATION AND THE AMENITY OF EDINBURGH.—The annual report by the Council of the Cockburn Association alludes to the proposal to convert the Royal High School into a National Gallery and School of Art, and expresses the view that it will be a source of satisfaction to many that the proposal has been dropped. In the matter of the raising of the parapet of the Dean Bridge, the Association made a representation on the subject to the Town Council. The proposal was dropped, and the Council hope that it will never be raised again. A more serious danger had threatened the Dean Bridge in the shape of a project to run tramways over the bridge. Apart from the question of overhead posts and wires, which would have disfigured the bridge, the chief objection was that the running of tramways without danger to the public would have necessitated the widening of the bridge, and it was felt that that could not be done without detracting from

the present graceful lines upon which the bridge is constructed, and thereby destroying one of Telfer's greatest works. It was with regret that the Council recorded the demolition of a part of the historic Flodden wall in connexion with the building of a new school in Drummond-street. Fortunately the amount destroyed is not of very great extent, and the best portion of the wall, it is stated, still remains untouched. The attention of the School Board having been drawn to the matter, a brass tablet recording the history of the wall has been fixed upon the remaining portion of the wall at the entrance to the school. The Council draw attention to the care displayed by Messrs. W. & R. Chambers when adding to their premises in Byres Close. The new building has been designed as far as possible to be in harmony with its surroundings. Otherwise the view of the Old Town from Princes-street would have been seriously damaged. The new headquarters of the Queen's Rifle Volunteer Brigade in Forrest-road is quoted as a successful example of an effort to harmonise the architecture of a new building with the general character of its surroundings. The North British and Mercantile Insurance Company buildings in Princes-street and the new branch of the British Linen Bank in George-street are referred to as forming considerable acquisitions to the dignity of their respective surroundings.

BRISTOL MASTER BUILDERS' ASSOCIATION.—The annual dinner of Bristol Master Builders' Association took place on the 20th ult. at the Royal Hotel, the President (Mr. E. I. Neale) being in the chair. The Royal toasts were proposed by the President. Mr. A. N. Jones (President Bristol Channel Timber Importers' Association) submitted "Our Civic Rulers," and Alderman Parsons, in replying, said Bristol was a city with great traditions, and he claimed that the civic rulers desired to do their duty earnestly and faithfully in accordance with those traditions. Side by side with the expenditure on Avondale Dock, large sums of money had been spent in providing adequate facilities for the old city docks.—Councillor E. M. Dyer said he felt surprised that the masters builders were so passive, for he thought that the citizens were called upon to pay too much for work which the Corporation carried out, and which, to his way of thinking, should be put up to public competition. The timber trade was developing at Portishead, and he hoped that it would prove a great success.—Mr. Frank N. Cowlin submitted "The Trade and Commerce of Bristol." He coupled with the toast the name of the President of the Bristol Chamber of Commerce.—The President of the Chamber of Commerce (Mr. S. Humphries) said that in Bristol they had to compete against rival ports, and if dues were reasonably lowered, there was no reason why Bristol should not supply the whole of the great district of the Midlands. The railway rates from Bristol were better than those which existed at Liverpool, and if the ship dock expenses were looked to there was no reason why Bristol should not dominate the district he had alluded to.—The Mayor of Bath (Mr. C. Bryan Oliver) proposed "The National and South-Western Federations of Master Builders of Great Britain." He remarked that the Federations had done an enormous amount of good in times of labour troubles by preventing strikes. They had been established not for coercive, but for protective, purposes.—Mr. E. W. Wooster (Bath), President of the South-Western Federation, responded, and alluded to the position which the organisation held. He claimed that it had raised the standard of their industry to a degree more commensurate with the importance of the work done. The influence of these bodies had been felt, he agreed with the proposer of the toast, in dealing with trade disputes with the workpeople, in arriving at amicable understandings, and so preventing strikes.—Mr. A. Dowling (ex-President), who followed, claimed that the West of England Federation did not exist to tyrannise. It enabled them to make their voices heard in regard to conditions of tendering and contracting in a way that would be impossible for a single member or even the association of a single town. They were also united to the National Federation, and participated in, as well as assisted in, accumulating a large reserve fund; but their object was to act equitably.—Mr. R. F. Wilkins gave "Architects, Engineers, and Surveyors," and Mr. Frank W. Wills, Mr. A. P. I. Cotterell, and Mr. Peter Addie (City Surveyor and Valuer) responded.—Mr. George Humphreys (Treasurer), proposed the toast of "Kindred Associations," Mr. G. H. Perrin and Mr. T. Godfrey responding. "The Visitors" were duly honoured, on the proposition of Mr. E. Walters, and acknowledged by Mr. W. Webb (President, Bath Association). Mr. W. H. Brown proposed "The Bristol Master Builders' Association."—The President said he desired to thank the members of the Bristol Association for the very hearty manner in which they had supported him during his two years of office as President. It was very gratifying to know that their Association was increasing in numbers, although his friend the Treasurer (Mr. George Humphries) reminded him that their expenses were increasing. He was sorry that during his term of office the building trade had been in a depressed state, but he thought that there were indications of better prospects. He was pleased to say that the relationship between the builders and their workmen was most satisfactory, and the Association had decided not to ask for a reduction of wages, believing that better and more prosperous times were ahead.—Mr. R. F. Ridd was inducted as the new President, and the chain and badge of office placed upon his shoulders.

GLASGOW ARCHITECTURAL CRAFTSMEN'S SOCIETY.—A meeting of this Society was held last week in the Technical College, the President (Mr. Colin Sinclair) in the chair, when Professor Charles Gourlay delivered a lecture on Salonica, illustrated by lantern slides, also by drawings and photographs, some of which were taken by the lecturer. Professor Gourlay said that the modern town of Salonica was first known in history as Therma, but Cassander changed its name to Thessalonica after the name of and in honour of his wife. After touching upon the many historical associations, both sacred and classical, connected with the city and describing its beautiful situation, the lecturer referred to its ancient walls, white tower, and sculptured Roman arch. Then in considerable detail he described in the following order the Early Christian and Byzantine churches, now mosques, which still remain in a remarkably well preserved state in this modern Turkish town. The Church of St. George, with its circular nave and beautiful mosaic decoration of the interior of its dome, which is the greatest and best work in Byzantine mosaic now in existence; the Mosque of Eski Djouma (formerly a three-aisled basilican church); the Church of St. Demetrius, one of the best preserved and most finely proportioned of five-aisled basiljcas of the Early Christian period; the Church of Sta. Sophia, with its interesting plan and dome at the crossing, which is decorated internally with a very beautiful mosaic, the subject being the Ascension; lastly, the later examples: St. Elias, with its triapsal plan; St. Bardias, having the typical Greek cross plan; the Holy Apostles, with its one central and four smaller domes, showing thus in its pristine form that which became a universal feature of the Russian churches; and St. Pantelemon, a small but interesting church now restored.

PROPOSED ART SCHOOL FOR EDINBURGH.—The Lord Provost's Committee of Edinburgh Town Council discussed on the 21st ult. the proposal to found an art school in the city. It is understood that the Government are willing to contribute a certain sum towards this object on the understanding or undertaking that a considerable contribution is made by the city. It was stated that the Government were prepared, in the event of Edinburgh not doing something, to hand the sum over to Glasgow. Ultimately it was agreed to remit the matter to a sub-committee to consider as to the attitude to be taken up by the city.—*Glasgow Herald.*

PHOTOGRAPHIC SURVEY AND RECORD OF SURREY.—The annual meeting will be held in the lecture Hall, Public Library, Kingston-upon-Thames, at 3.30 p.m., on Saturday, March 10. The President, Viscount Midleton, will give an address, and the report of the Council and the accounts of the year ended December 31, 1905, will be submitted. The meeting is open, not only to members of and contributors to the Survey, but to all interested in its work and aims. Arrangements have been made for an exhibition consisting of a representative selection from the 2,000 prints already in the Survey collection, in the Art Gallery, Public Library, Kingston-upon-Thames. This will be open on the day of meeting until 9 p.m., and again during the following fortnight until dusk. A short lecture, illustrated by lantern slides, will be given on each Saturday evening at 8 p.m.

BRITISH FIRE PREVENTION COMMITTEE.—The Committee completed a further series of important fire tests last week, their investigations terminating late on Saturday. Two concrete floors were under test for the purpose of classification as affording "Full Protection" (Class B) against fire, this necessitating a fire test of four hours at temperatures reaching between 1,800 and 2,000 deg. F., followed by the application of water from a steam fire engine for five minutes (two branches), the floors being loaded with 2½ cwt. per ft. super. The one floor was of brick concrete reinforced with expanded metal lathing, supported by encased ordinary girders. The other floor was of clinker concrete reinforced with small joists, supported by encased broad flange girders. In both, "Ferrocrete" cement was used and the period allowed for the setting and drying was almost the same. Both floors obtained classification as affording "Full Protection." By the last-named floor test the Fire Prevention Committee again prove, among other matters, the superiority of clinker concrete *versus* Thames ballast concrete as a fire resistant, a floor of almost identical design of Thames ballast concrete having failed last autumn. Two fire tests with roller shutters (Kinnear type) were also completed by the Fire Prevention Committee, one with double shutters for a four-hour test, and one with a single shutter for a two and a half hour test, followed by the application of water. Both attained classification as "Fully Protective" (Class B and Class A respectively); both were of thin steel plate under ½ in. thick, and both had, prior to the final application of water, been subjected to streams of water fifty minutes before the conclusion of the tests—*i.e.*, they had this additional test applied beyond what was necessary for classification.

## Legal.

### WEST-END ANCIENT-LIGHT CASE.

IN the Chancery Division, on the 1st inst., Mr. Justice Joyce concluded the hearing of the case of Fryzer *v.* Windus and Others—an action by the plaintiff, Mr. Alfred Fryzer, against the defendants, Mr. James Windus, Mr. W. S. Hoare, and Messrs. E. Lawrence & Sons, builders, for an injunction to restrain the defendants, their servants and agents, from erecting or continuing the erection of new buildings so as to cause a nuisance to the plaintiff or his premises, and from injuring darkening, or obstructing the access of light to and through a skylight and certain windows in the plaintiff's premises as the same were formerly enjoyed, and an order to pull down so much of the buildings as were higher than the old buildings which formerly stood on the site. There was also a claim for damages. The statement of claim alleged that the height of the defendants' old buildings was 48 ft. from the ground level and 23 ft. from the party wall, and that defendants had erected on the site a new building consisting of shops, warehouses, and tenements, the rear walls of which were about 60 ft. in height, and only about 10 ft. from the party wall. Plaintiff alleged that the effect on this was to cause a substantial decrease of light coming to the lights and windows in question, and was such as to render his house uncomfortable according to the ordinary notions of mankind. There was also a claim for trespass in connexion with the party wall.

The defendants did not admit that any of the plaintiff's lights were ancient. They also said that the walls of the old buildings they had demolished were dark and unsightly, and no light could be reflected from them, whereas the walls complained of of the new buildings were faced with white glazed bricks, which afforded a considerable amount of light to plaintiff's premises. They further denied that their new buildings had or would cause any nuisance to the plaintiff as alleged, and that they would to any appreciable extent affect the plaintiff's light or interfere with the comfortable enjoyment by the plaintiff or his tenants of the premises.

Mr. Hughes, K.C., and Mr. Crossfield appeared for the plaintiff, and Mr. Younger, K.C., and Mr. E. Ford for the defendants.

Mr. Hughes, in opening the case, said it raised two points, the important one being the question of ancient lights, and the other a minor question about a party wall. The plaintiff was the lessee of a building named Cavendish-chambers, which was in a street recently called Duke-street, but was now called Hallam-street. It was a large building, and the plaintiff was the leaseholder, his term being seven years from Christmas, 1904. The rental of the plaintiff's building was 300*l.* a year, and it was let out by him as residential chambers. The windows affected were nine in number. The defendants, Windus and Hoare, had an agreement for a lease of certain buildings in Great Portland-street, being at the back of the plaintiff's premises. Defendants had pulled the premises down and had rebuilt them. Both the defendants' buildings were erected under one contract.

Mr. Younger said that so far as he could see the building complained of was that of Mr. Hoare and not that of Mr. Windus.

Mr. Hughes said that for all practical purposes defendants were partners in the matter.

Mr. Younger said he appeared for all the defendants, but he did not admit that statement of his learned friend. He had got to make his case against each defendant.

Mr. Hughes: Oh, yes. So far as regards an injunction no difficulty arises, but on the question of damages there might be some difficulty about severance of damages.

Continuing, the learned counsel said that the writ was issued in May last, when the defendants buildings had not gone very far. On June 20 1905, a motion was made for an *interim* injunction, but by consent no order was made on the motion, although it was agreed that plaintiff was not to be prejudiced by the building having gone on since the date of the motion. It was said by the defendants that the plaintiff's lights were not ancient, but he could prove they were. The windows in question were by no means too well lighted before the defendants' buildings were put up, and the result of what had been taken away was to render the rooms gloomy and uncomfortable. He should call evidence to show that the effect of what had been done was to substantially diminish the letting value of the

plaintiff's property. The other point with regard to the party wall arose in this way. The building owners, wanting to interfere with the party wall between the two properties, gave the usual notice, and a Mr. James Naylor acted for the plaintiff, and a Mr. White for the defendants, and an award was made as to the alteration that might be made in the party wall. In point of fact, the party wall was raised higher than the award allowed.

His lordship: What do defendants say about that?

Mr. Hughes said that they declined to pull it down, and set up the contention that they were entitled to another award. When the plaintiff's architect complainedt, he defendants' architect said he should go to a third surveyor to see if he was entitled to keep the wall as it was.

Mr. Younger said the plaintiff pleaded that the party wall was a trespass and an interference with the light. The defendants said there was no ground for saying that the wall interfered with the light, and so far as trespass was concerned the case was in the hands of a third surveyor. He thought that so far as trespass was concerned it was very trivial.

Mr. James Naylor, A.R.I.B.A., examined by Mr. Hughes, said he practised at No. 19, Hanover-square, and was Assistant District Surveyor for Marylebone. He was called in to advise on this matter on February 21, 1905. He had carefully examined and measured the buildings, and had prepared the drawings counsel had made use of. He had inspected the interior of the plaintiff's building on the question of light. The windows "A and B" lighted the rear room on the first floor, which was unoccupied at present. "C" lighted the staircase, "D" a water-closet and bathroom, "E" a sitting-room, "F" a water-closet on the ground floor, "K" a bedroom on the ground floor, "M" the studio, and "N" a sitting-room. There was a room just behind the studio which got its sole light from the skylight in the studio. He went into all the rooms before the defendants' buildings were completed, and had been into the several rooms since the defendants' buildings were completed. The room lighted by the two windows "A and B" was now uncomfortably dark; so much so that a gentleman could not see to shave in it except on a bright summer day. Before the defendants' buildings were put up the light was none too good, but now it was very much worse. The staircase light was important. Since the defendants' building had been put up it had made the hall distinctly gloomy and the staircase badly lighted.

The witness was then examined as to the other windows and lights said to have been affected by the defandants' buildings, and gave evidence to the effect that the light was now substantially less than it was before. He considered that owing to the defendants' buildings the depreciation in the letting value of the plaintiff's building would be about 35 per cent. As to the party wall, the piece put on not sanctioned by the award was shown on the model.

His lordship said here that some arrangement ought to be come to on that part of the case.

Mr. Younger said that his clients would pull that part of the wall down.

His lordship: Therefore it is not necessary to go into that part of the case. I should have thought that for a small sum the plaintiff might allow it to remain up.

The witness, in cross-examination by Mr. Younger, said that his view was that the light to all the windows in question had been damaged by what the defendants had done. An artist was still in occupation of the studio. The glass in the roof was slightly obscured by a coating of dust. It was a well-lighted room before the defendants' buildings were erected. It was now an extremely gloomy room, perfectly useless as a studio and practically useless for residential purposes. He thought the result of the defendants' operations had been to depreciate the letting value of the plaintiff's rooms by 35 per cent. He thought the rental value of the studio was reduced by 50 per cent.

The rent of the studio is 100*l.* a year?—Yes.

Therefore, according to you the present value of it is 50*l.* a year?—Yes; it can never again be used as a studio.

Mr. E. A. Gruning, F.R.I.B.A., examined by Mr. Hughes, said he had not known either the plaintiff's or the defendants' buildings before. He had examined the plans and models and, had visited the buildings on May 29, 1905, and February 9 last. Both were fine days. When he went in May last defendants' buildings were not completed. In his opinion the defendants' buildings had very materially affected the light coming to plaintiff's windows on the ground and first floors.

In their present condition are the living rooms comfortable according to the ordinary notions of mankind in respect of light?—No, I do not think they are.

Are they in such a condition of light that a man could carry on his ordinary occupation there as beneficially as before?—Certainly not.

Eaxmination continued.

One-third of the light falling on the floor of the ante-room at the back of the studio had been taken away now.

In answer to his lordship, witness said he understood that the studio had been a good one, and had been used for the purpose of painting portraits.

Cross-examined by Mr. Younger. He had no knowledge of the premises prior to his first visit in May last year.

Evidence was also given on behalf of the plaintiff by Mr. John Slater, F.R.I.B.A., Mr. G.R. Crickmay, F.R.I.B.A., and Mr. C. H. Giddy, of Messrs. Giddy & Giddy.

At the close of the plaintiff's case Professor Beresford Pite, F.R.I.B.A., was the first witness called for the defence. He said he had visited the premises in question first in May of last year and afterwards in February of this. The opinion he formed was that the defendants' buildings had not caused a serious or material obstruction of light to the plaintiff's windows, and sufficient light was left for the quiet, comfortable use and occupation of the premises. He was confirmed in his opinion by his subsequent examinations of the premises. At the present time the unobstructed light to the windows "A and B" was 49½ degrees. In his opinion the studio was a well-lighted room. Defendants' premises had not in his opinion appreciably affected the light of the studio. With regard to the other rooms, they were all sufficiently lighted, many of them being exceedingly well-lighted for bedrooms. He had made the usual tests in the rooms, and found that he could read small print in all parts of the rooms.

Cross-examination.

He held the opinion that a bedroom could be too well-lighted.

The following experts also gave evidence in support of the defendants' case—Mr. Matthews, F.R.I.B.A., Mr. Howard Chatfeild Clarke, F.R.I.B.A., and Mr. W. H. White, F.R.I.B.A.

At the conclusion of the addresses of counsel his lordship reserved judgment.

## ACTION BY CIVIL ENGINEER FOR FEES.

On the 22nd ult. the hearing was concluded of the case of Walton *v.* Cartland and others before Mr. Justice A. T. Lawrence and a special jury, an action brought by Mr. J. B. Walton, a civil engineer, of Hythe, Kent, against Mr. J. F. H. Cartland (since deceased and then represented by his executors) and Mr. Joseph Rowlands, of Birmingham, to recover a sum of money for services rendered to the defendants and for money paid at their request.

The defendants denied that they employed the plaintiff, and they further said that they had paid him all that was due. Third parties were represented in the case, viz., the Great Western Railway Company and a Mr. L. R. Walker.

Mr. Hugo Young, K.C., and Mr. Whateley appeared for the plaintiff; Mr. Montague Lush, K.C., and Mr. Horace Rowlands for the defendants; Mr. J. A. Simon for the Great Western Railway Company; and Mr. Coles Preedy for Mr. Walker.

Mr. Young, in opening the case, said that the claim was made by the plaintiff, an engineer, for services rendered in connexion with the making of a new line in Wales called the North Pembrokeshire and Fishguard Railway, and which constituted a through route to Ireland. The line was now under the control of the Great Western Railway Company and would be very soon opened. There was, apparently, no question as to the plaintiff being entitled to be paid; the point was, who was to pay him? The amount he was entitled to could not be determined by the jury; that would have to be got elsewhere. The jury would have to say whether the plaintiff was not right in trying to fix the responsibility on the gentlemen with whom he contracted, leaving them to be indemnified by anybody upon whose shoulders liability ought ultimately to fall. The learned counsel then narrated in detail the various steps taken to complete certain lines in this locality, and said that in 1902 the company entered into a contract with a Mr. O'Kell to make a line from Rosebush to Fishguard, the consideration being that he should receive the whole of the shares of the company, the latter undertaking to invite public subscription for the same. This contract was assigned by Mr. O'Kell to Mr. Rowlands and Mr. Cartland. In 1903 the idea entered the heads of Messrs. Rowlands and Cartland of extending the local railway to Fishguard, to have a pier and harbour at Fishguard, making the through route to Ireland. The details of the various schemes which were subsequently presented to Parliament were explained, and it was stated that in October, 1905, the plaintiff was employed by the defendants to do certain work. Plaintiff was paid an amount of money under that contract, but the present claim was in respect of extra work for which he was entitled to be remunerated, as the whole original idea of the scheme was altered, and he had so much additional work to do.

After a great deal of evidence had been given, the whole matter was referred to the official referee, Mr. Edward Pollock.

## ACTION BY DECORATIVE ARTIST AGAINST BUILDERS.

The case of De Jong *v.* James Johnson & Sons, Ltd., came before Mr. Justice Lawrence in the King's Bench Division on the 24th ult., an action by Mr. Felix De Jong, a decorative artist, to recover from the defendants 777*l.*, being the balance of an account for plastering and decorative work done in connexion with the erection of the Alhambra Theatre of Varieties, Gateshead. The total bill was 1,277*l.*, but 500*l.* had been received.

Mr. E. F. Lever, who appeared for the plaintiff, said the question for his lordship was, whether in suing the defendants plaintiff was suing the proper persons. There were three people concerned in the erection of the theatre. There was the theatre company, the building owners, Mr. James Johnson, the original builder, who undertook to do the whole of the work, and James Johnson & Sons, Ltd., which was a company formed for the purpose of carrying on his business. The defendants said that the plaintiff should have sued the theatre company, who were the building owners, but he contended that it was the present defendants who were liable. In May, 1904, when the theatre was to be erected, his client got into communication with Mr. Stewart Mould, who was the architect, and who, it was plaintiff's contention, was acting for Mr. Johnson with reference to the sub-contract for work which was done by the plaintiff. He believed that the sub-contractor always looked to the builder for payment, and therefore, as in this case, the builder was liable. Mr. Mould had given a certificate for 500*l.*, representing a part of the work done, and this was sent to Mr. Johnson with a request for payment, and James Johnson & Sons, Ltd., sent the cheque.

The plaintiff gave evidence that Mr. Mould told him that the amount to be paid him for his work was a provisional sum to be included in the builders' contract.

Mr. Garland, who represented the defendants, said his contention was that right through Mr. Mould was acting on behalf of the theatre company and not for the defendants, and he did not think Mr. Mould had any authority to give any undertaking.

In the result, his lordship, in giving judgment, said the conclusion he had arrived at was that Mr. Johnson, sen., was greatly interested in the theatre company, and he was the person who had the money and was financing that company. The present defendants had not made themselves liable, and therefore he gave judgment for the defendants with costs.

## PATENTS OF THE WEEK.

### APPLICATIONS PUBLISHED.*

3,268 of 1905.—J. N. Russell: *Method of and means for Heating Buildings by the Circulation of Steam or Vapour.*

This relates to an installation for heating a building by the circulation of steam or vapour, and consists in the combination of a vacuum-creating device to which the outlets of the several heating units are connected, with devices provided upon the inlets to the respective heating units adapted to be manually adjusted without dismantling the valve so as to permit of the maximum opening of said inlets being instantly varied.

6,529 of 1905.—A Robertson: *Sliding Sashes for Windows.*

This relates to a sliding sash for windows sliding in an outer frame and operated by racks and pinions, and consists in the provision of channels in said sash with ratchet-teeth at the bottoms of said channels, and of loose bars located in said channels and provided on the underside with corresponding ratchet-teeth to those in the channels, so that when the loose bars are moved the ratchet-teeth over-ride and press the rail against the water-tight packing on the outer frame.

9,079 of 1905.—The Prefector Window Company, Ltd., and T. F. Caunt: *Casemen Windows.*

This relates to a casement window in which the casement revolves on vertical axles, and which has a U-shaped moulding at the top and bottom, and L-shaped mouldings at the sides.

10,454 of 1905.—F. D. Robinson: *Lourve Ventilator for Top, Bottom, or side of Window Sash or Casement.*

This relates to a detachable window or like ventilator, and is characterised by a frame provided with a series of lourve bars formed in one with the frame or attached thereto either rigidly or pivotally, a gauze or perforated zinc backing to said bars and frame, means such as grooves for the reception of the sash cords when used as a top ventilator, and means such as bevelled top and bottom edges to fit the window sill and under edge of bottom rail or sash when used as a bottom ventilator.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

11,128 of 1905.—G. G. BRODIE and A. B. COLEMAN: *Kitchen or Cooking Ranges.*

This relates to a kitchen or cooking-range, and consists in the combination with a fixed tubular socket made in one piece with the rising and falling hinged bottom of the fire-box of a kitchen or cooking-range, of a pivoted catch having two arms or projections, one of which projects into the fixed tubular socket, and is operated upon by the lifting bar which is introduced into the socket, while the other arm or projection normally engages with one of the teeth of the fixed rack on the front of the range.

11,682 of 1905.—G. GLOSSOP, T. EARNSHAW, and F. J. CLOUGH: *Facings of Cement Blocks or the like.*

This relates to a compound cement block or the like, having an exterior metal plate provided with bosses and wires or rods on to which the cement is moulded or otherwise formed.

12,348 of 1905.—S. WARREN and C. ELCOCK: *Casement Stays and Fastenings.*

This relates to a casement stay and fastener consisting of a slotted plate attached to the sill or other part of the casement frame, a slotted plate attached to the sash and a bar, having at one end a tightening screw to run in the slot of the plate attached to the sill or other part of the frame, and having its opposite end pivoted to an angle plate, one limb of which is furnished with a tightening screw to run in the slot of the plate attached to the sash.

12,621 of 1905.—C. A. LOWE: *Means for Arresting Dust and Other Floating Particles.*

This relates to means for arresting or intercepting dust and other floating particles, and comprises a series of fabric frames so disposed as to arrest and hold-in floating particles drawn or blown into contact therewith, said frames being slid into position in the casing whereby they are capable of being readily removed to be cleansed.

13,363 of 1905.—H. LORD: *Fasteners for Window Sashes.*

This relates to a fastener for window sashes, and consists of a plate attached to the lower bar of the upper sash of the window. This plate can be secured to the bar of the window by screws or any other convenient means. To this plate is hinged another plate which is so arranged as to be capable when both sashes are in their closed positions of swivelling over on top of the upper bar to the lower ash. This swivelling plate is provided with a slot. Then there is attached by screws or otherwise to the top bar of the lower sash a plate which is provided with an upwardly-projecting rotatable pin. This pin has a flat head, which can be passed through the slot in the swivelling-plate, and then given a quarter turn, which locks the swivelling-plate to the plate on the lower sash, and thus holds both sashes in their closed positions.

17,317 of 1905.—O. A. OSMONSON: *Apparatus for Calculating the Dimensions of Framework, and the like.*

This relates to an apparatus for calculating the dimensions of framework and the like, and consists of a measuring tool, a pair of pivotally-connected arms, each including a bottom and top member spaced apart, said top members being provided with longitudinal slots, in combination with a longitudinally slotted third member adjustable in the spaces between the bottom and the top members of the pivoted arms, and means for securing said arms and third member in adjusted position.

18,409 of 1905.—V. F. FEENY: *Farm Gates, Road Gates, and the like.*

This relates to farm gates, road gates, and the like, and consists in the combination of an oscillating lever provided with a slotted link perpendicular thereto, a single faced cam plate against which a roller fitted hinge pin bears, and adjustable connexions on each side of the gate from each end of the lever to opposite sides of spring held rotatable drums.

18,952 of 1905.—W. H. COULTER and J. B. COULTER: *Machines for Dressing and Performing Similar Operations upon Stone, Marble, Granite, and the like.*

This relates to a machine for dressing and performing similar operations upon stone, marble, granite, and the like, and consists of means for moving the belt forks for bringing about the reversal of the movement of the table, said means comprising adjustable dog brackets provided with loose collars or anti-friction bowls adapted to actuate through the intervention of an adjustable stud, and system of levers connected to the said shaft.

21,444 of 1905.—F. KAEFERLE: *An Electro-magnetically Operated Heat Supply Valve for Heating and Ventilation.*

This relates to an electro-magnetically operated heat supply valve, and consists in the construction employed wherein the electro-magnet adapted to operate the valve is situated outside the chamber containing the valve and the armature connected to the latter, the arrangement being such that the lines of force due to said electro-magnet act directly on said armature through the wall or partition by which the electro-magnet is separated from the valve chamber.

22,845 of 1905.—J. SOSS: *Window Sash Balances.*

This relates to a sash balancing device, and consists of a rack plate adapted to be secured to the side of a sash, a plate adapted to be secured to a window frame, adjacent to the side of the sash, said plate being provided near its upper end with an outwardly directed bracket and at its lower end with an outwardly directed bearing provided on its upper end with ratchet-teeth, a clutch-head mounted on said bearing and provided with ratchet-teeth which correspond with those on the bearing, said clutch-head being also provided with an upwardly directed spindle and with radially arranged holes, a tube passing through said bracket, and on the lower end of which fit the spindles of the clutch-head, said tube being provided with a worm gear which operates in connexion with the rack on the sash, means for forcing the tube in the direction of the sash, and a spiral spring plate in said tube, one end of which is secured to the upper end of said tube and the other end to the spindle of the clutch-head.

10,504 of 1905.—E. E. MAWLE: *Pipe Attachment for Improving Connexions of Branch Pipes to Main Pipes in Water and Other Pipes.*

This relates to a pipe attachment for improving the flow of water or other liquids to and from main to branch pipes, and consists in the arrangement and construction of an internal deflecting lip which is cast solid on to a saddle which can be screwed over branch pipe and bolted on to an existing main pipe.

15,164 of 1905.—P. HABAY: *Railway Sleepers Composed of Cement Concrete in Conjunction with Metal.*

This relates to the construction of railway sleepers composed of cement concrete, in conjunction with metal, and consists in providing the metallic framework and cement concrete with means for securing the chairs to support the rails thereon and to prevent the movement of the sleeper on the road.

## SOME RECENT SALES OF PROPERTY:
### ESTATE EXCHANGE REPORT.

February 19.—By LEOPOLD FARMER & SONS.

| | |
|---|---|
| Clapton.—102, 104, 108, and 110, Millfields-rd. (s.), f., y.r. 130*l.* | £1,725 |
| Millfields-rd., f.g.r. 7*l.*, reversion in 70 yrs. | 200 |
| Stamford Hill.—Victoria-rd., f.g.r. 5*l.* 5s., reversion in 69 yrs. | 130 |
| 4 and 6, Victoria-rd., f., w.r. 54*l.* 10s. | 465 |
| Clapton.—69, Blurton-rd., f., w.r. 39*l.* | 475 |

By GARRETT, WHITE, & POLAND.

| | |
|---|---|
| Regent-street.—40, Conduit-st. (s.), area 2,675 ft., Corporation lease, g.r. 8*l.* 15s., y.r. 450*l.* | 14,500 |

By HARRODS'.

| | |
|---|---|
| Brompton.—32, Brompton-sq., f., p. | 4,200 |

February 20.—By C. D. LEVY.

| | |
|---|---|
| Fulham.—Chaldon-rd., f.g.r. 10*l.*, reversion in 74 yrs. | 215 |
| Battersea.—Orkney-st., f.g.r. 20*l.*, reversion in 57 yrs. | 440 |

By ERNEST OWERS.

| | |
|---|---|
| Willesden Green.—437, High-rd. (s.), u.t. 88½ yrs., g.r. 11*l.* 11s., y.r. 60*l.* | 450 |

By TABERNACLE & SON.

| | |
|---|---|
| Holborn.—Dorrington-st., "The Salmon and Compasses" p.h., a freehold rental of 100*l.*, reversion in 28¾ yrs. | 2,750 |
| Notting Hill.—Lockton-st., "The Station Hotel," a freehold rental of 100*l.*, reversion in 46¼ yrs. | 2,660 |
| Kensal New Town.—West-row, "The Foresters' Arms," p.h., an improved rental of 80*l.* per annum for 36 yrs., with reversion | 1,200 |

By S. WALKER & SON.

| | |
|---|---|
| Brixton.—24 and 25, Elliott-rd., u.t. 57½ yrs., g.r. 12*l.*, w.r. 120*l.* 18s. | 410 |
| Woolwich (Kent).—39, Church-st. (s.), and 2, 4, and 6, Kingsman-st., f., y.r. 71*l.* 16s. | 470 |

February 21.—By G. ERNEST CLARKE.

| | |
|---|---|
| Walthamstow.—89, Grove-rd. (s.), f., y.r. 28*l.* | 365 |
| 102, Grove-rd., f., p. | 230 |
| 35, Pembroke-rd., f., y.r. 10*l.* | 300 |
| 20, The Drive, u.t. 57½ yrs., g.r. 10*l.*, e.r. 60*l.* | 625 |

FOSTER & CRANFIELD.

| | |
|---|---|
| Wandsworth.—Keswick-ter., f.g.r. 33*l.* 12s., reversion in 74½ yrs. | 810 |
| Summerley-st., f.g.r. 25*l.* 4s., reversion in 74½ yrs. | 570 |
| Skelbrook-st., f.g.r. 37*l.* 16s., reversion in 74½ yrs. | 850 |
| Chiswick.—Duke-rd., f.g. rents 92*l.* 10s., reversion in 62½ yrs. | 2,075 |

WILLIAM HOLLIS.

| | |
|---|---|
| Kentish Town.—61, Lawford-rd., u.t. 55 yrs., g.r. 8*l.*, y.r. 50*l.* | 480 |
| Mill Hill.—3 and 5, Hale Grove-gdns., u.t. 96 yrs., g.r. 14*l.*, y.r. 79*l.* | 960 |
| Finchley.—61 and 63, Station-rd., u.t. 71 yrs., g.r. 10*l.*, y.r. 76*l.* | 690 |
| Dollis-rd., "Glenmore," u.t. 80 yrs., g.r. 10*l.* 10s., e.r. 50*l.* | 475 |

PROTHEROE & MORRIS

| | |
|---|---|
| Clapton.—Elmcroft-rd., f.g. rents 97*l.* 5s., reversion in 79 and 80 yrs. | 2,370 |
| Rushmore-rd., f.g. rents 91*l.* 18s., reversion in 79 yrs. | 2,275 |
| 14, College-av., u.t. 58½ yrs., g.r. 6*l.*, p. | 285 |

By TOWERS, ELLIS, & Co.

| | |
|---|---|
| Hyde Park.—16, Cambridge-sq., u.t. 29¾ yrs., g.r. 21*l.*, p. | 2,250 |

By PROTHEROE & MORRIS (at Leytonstone).

| | |
|---|---|
| Walthamstow.—Higham Hill-rd., two freehold building sites | £106 |

February 22.—By H. J. BLISS & SONS.

| | |
|---|---|
| Highgate.—Salisbury-rd., f.g. rents 18*l.*, reversion in 44½ yrs. | 400 |

By E. GIBBS & Co.

| | |
|---|---|
| Camberwell.—10, Boyson-rd., u.t. 45 yrs., g.r. 6*l.*, w.r. 65*l.* | 325 |
| 55, Herne Hill-rd., u.t. 67 yrs., g.r. 7*l.* 10s., e.r. 45*l.* | 440 |

By WESTMORE & YOUNG.

| | |
|---|---|
| Norwood.—46, Belvedere-rd., f., y.r. 40*l.* | 500 |

By NEWBON, EDWARDS, & SHEPHARD.

| | |
|---|---|
| Islington.—Almorah-rd., f.g.r. 60*l.*, reversion in 46½ yrs. | 1,520 |
| Balls Pond.—Mildmay-st., f.g.r. 9*l.*, reversion in 45½ yrs. | 300 |
| Highbury.—Highbury-hill, f.g.r. 15*l.*, reversion in 52½ yrs. | 380 |
| Brixton.—Church-rd., f.g. rents 50*l.* 8s., reversion in 53 yrs. | 1,270 |
| Crouch End.—Crouch End-hill, f.g. rents 27*l.*, reversion in 54 yrs. | 690 |
| Edison-rd., f.g.r. 18*l.*, reversion in 54 yrs. | 465 |
| Hornsey.—Middle-la., f.g.r. 25*l.* 10s., reversion in 73 yrs. | 640 |
| Harringay.—Beresford-rd., f.g. rents 14*l.*, reversion in 92½ yrs. | 350 |
| Wood Green.—Caxton-rd., f.g.r. 10*l.* 10s., reversion in 80 yrs. | 280 |
| Bowes Park.—Sydney-rd., f.g.r. 24*l.*, reversion in 92 yrs. | 600 |
| Kilburn.—Maygrove-rd., f.g.r. 9*l.* 9s., reversion in 81 yrs. | 245 |
| Ilford.—St. Mary's-rd., f.g.r. 22*l.* 10s., reversion in 90 yrs. | 560 |
| Balham.—Byrne-rd., f.g. rents 48*l.* 18s., reversion in 50½ yrs. | 835 |
| Kingsland.—8, Albion-rd., u.t. 33 yrs., g.r. 4*l.* 4s., y.r. 34*l.* | 230 |
| Hackney.—14 and 15, Blackstone-rd., u.t. 41 yrs., g.r. 10*l.*, w.r. 67*l.* 12s. | 365 |
| Islington.—10, Astey's-row, u.t. 29½ yrs., g.r. 20*l.*, y.r. 36*l.* | 125 |
| 46, Arlington-sq., u.t. 21½ yrs., g.r. 5*l.* 5s., e.r. 48*l.* | 280 |
| Caledonian Road.—15, 17, and 19, Bryan-st., u.t. 36 yrs., g.r. 10*l.* 10s., y.r. 78*l.* | 705 |

By STIMSON & SONS.

| | |
|---|---|
| Brixton.—82, 84, and 86, Brandon-rd., f., w.r. 89*l.* 14s. | 910 |
| 183 to 189 (odd), Lyham-rd., u.t. 56 yrs., g.r. 10*l.*, w.r. 114*l.* 8s. | 710 |
| 9 and 11, Evandale-rd., u.t. 8 yrs. g.r. 5*l.* 12s., y.r. 64*l.* | 160 |
| 12, 32, 33, and 34, Elliott-rd., u.t. 57 yrs., g.r. 21*l.*, y.r. 128*l.* | 1,250 |
| 5A, Elliott-rd. (s.), beneficial underlease for 5½ yrs., y.r. 20*l.* | 425 |
| New Cross.—27, St. James', u.t. 58¾ yrs., g.r. 7*l.* 7s., y.r. 45*l.* | 450 |
| Camberwell.—21 to 24, Addington-sq., f., w.r. 128*l.* 14s. | 1,160 |
| Wandsworth.—22, Pentland-st., u.t. 93 yrs., g.r. 6*l.* 10s., y.r. 39*l.* | 300 |
| Bermondsey.—2, 4, and 6, Stanworth-st., f., w.r. 93*l.* 12s. | 900 |
| Rotherhithe.—2 and 4, Union-rd. s.), u.t. 34 yrs., g.r. 7*l.* 10s., y.r. 80*l.* | 1,000 |
| Wood Green.—108 and 110, Commercial-rd., f., y.r. 56*l.* | 710 |

February 23.—By BROWETT & TAYLOR.

| | |
|---|---|
| Woolwich (Kent).—Re-l Lion-la., f.g.r. 9*l.*, reversion in 34½ yrs. | 225 |
| 1, Ordnance-ter., f., w.r. 32*l.* 10s. | 145 |

By GREEN & SON.

| | |
|---|---|
| Hammersmith.—70, 74, 76, 78, and 80, Dalling-rd. (s.), u.t. 72 yrs., g.r. 30*l.*, y.r. 200*l.* 10s. | 2,200 |
| 193, Hammersmith-rd. (s.), u.t. 65½ yrs., g.r. 20*l.*, y.r. 90*l.* | 600 |
| Barnes.—20, Lonsdale-rd., u.t. 39 yrs., g.r. 10*l.*, e.r. 50*l.* | 320 |
| Sutton (Surrey).—52, High-st. ("Sutton Stores"), u.t. 73 yrs., g.r. 12*l.*, y.r. 110*l.* | 1,680 |
| Warwick-rd., f.g.r. 8*l.*, reversion in 74 yrs. | 175 |

By POTTERS'.

| | |
|---|---|
| Long Acre.—16, Endell-st. (s.), u.t. 22½ yrs., g.r. 20*l.*, y.r. 70*l.* | 600 |
| Hampstead.—50, Adelaide-rd., u.t. 37½ yrs., g.r. 7*l.*, p. | 510 |

*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for offices; s. for shops; ct. for court.

## MEETINGS.

FRIDAY, MARCH 2.

*Royal Institution.*—Dr. R. Caton, F.R.C.P., on "Hippocrates and the Newly-Discovered Health Temple at Cos." 9 p.m.

*Junior Institution of Engineers (Westminster Palace Hotel).*—(1) Paper on "Acceleration and Accelerometers" by Mr. A. P. Trotter, B.A., Electrical Adviser to the Board of Trade. 7 p.m.; (2) Paper on "Gas Engine Indicators" by Mr. L. F. de Peyrecave, Stud.Inst.C.E. 8 p.m.

SATURDAY, MARCH 3.

*Royal Institution.*—Professor J. J. Thomson, M.A., on "The Corpuscular Theory of Matter," I. 3 p.m.

MONDAY, MARCH 5.

*Royal Institute of British Architects.*—(1) A special general meeting to elect the Royal Gold Medallist for the current year. The Chairman to move—"That, subject to His Majesty's gracious sanction, the Royal Gold Medal for the promotion of Architecture be presented this year to Sir Lawrence Alma-Tadema, R.A., F.S.A."; (2) the ninth general meeting (business) to receive the report o-

the scrutineers on the election of twenty-eight candidates for Fellowship, and to proceed with the election of candidates for Associateship; (3) Mr. A. Saxon Snell will call attention to the terms of the Henry Saxon Snell Bequest, and ask what steps have been taken by the Council to formulate a scheme for the proposed scholarship or prize, and he will move a resolution. 8 p.m.

*Society of Engineers.*—Mr. R. G. Allanson-Winn, B.A., on "Submerged Chain Cable Groynes." 7.30 p.m.

*Liverpool Architectural Society.*—Mr. C. Spooner on "Church Fittings." Illustrated by lantern slides. 6 p.m.

TUESDAY, MARCH 6.

*Institute of Sanitary Engineers (Students' Lecture).*—Professor Adams on "Supervision of Works in Progress." 7 p.m.

*Institution of Civil Engineers.*—(1) Papers to be further discussed—"A Plea for Better Country Roads," by Mr. G. R. Jebb, and "Country Roads for Modern Traffic," by Mr. J. E. Blackwall, B.A.; (2, time permitting), "The Widnes and Runcorn Transporter-Bridge," by Mr. J. J. Webster. 8 p.m.

WEDNESDAY, MARCH 7.

*Royal Archæological Institute.*—Mr. Ambrose P. Boyson on "Low Set Openings in Danish and other Scandinavian Churches," with lantern illustrations. 4 p.m.

*Builders' Foremen and Clerks of Works' Institution.*—Ordinary meeting of the members. 8 p.m.

*Northern Architectural Association.*—Annual meeting. 7.30 p.m.

*Society of Arts.*—Mr. J. C. Dollman, A.R.W.S., on "Art in Painting and Photography." Mr. David Murray, R.A., will preside. 8 p.m.

*Edinburgh Architectural Association.*—Mr. R. S. Lorimer on "Scotch Gardens and Garden Architecture." 8 p.m.

THURSDAY, MARCH 8.

*Carpenters' Company, London Wall (Free Lectures on Matters Connected with Building).*—Mr. G. Gerald Stoney, B.E., on "Steam Turbines—Land and Marine." 8 p.m.

*Institution of Electrical Engineers.*—Mr. V. A. Fynn on "A New Single-Phase Commutator Motor." 8 p.m.

FRIDAY, MARCH 9.

*Architectural Association.*—Mr. Gilbert H. Lovegrove on "The A.A. Camera and Cycling Club Excursions," illustrated by lantern views. 7.30 p.m.

*Institution of Civil Engineers (Students' Meeting).*—Mr. R. Freeman on "The Design of a Two-Hinged Spandrel-Braced Steel Arch." 8 p.m.

SATURDAY, MARCH 10.

*Architectural Association.*—Spring visit to the Royal London Friendly Society's Building and Tollard Royal Hotel, Southampton-row, W.C. 2 p.m.

*Junior Institution of Engineers.*—Conversazione. Mr. C. Alfred Smith, B.Sc., on "The Evolution of the Man-of-War," illustrated by lantern slides. 8 p.m.

*Royal Institution.*—Professor J. J. Thomson, M.A., on "The Corpuscular Theory of Matter," II. 3 p.m.

*Edinburgh Architectural Association.*—Visits to Edinburgh Castle and addition to City Chambers.


## TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 26s. per annum.

Remittances (payable to J. MORGAN) should be addressed to The Publisher of "THE BUILDER," Catherine-street, W.C.

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office 19s. per annum (52 numbers) or 4s. 9d. per quarter (13 numbers), can ensure receiving "The Builder" by *Friday Morning's Post.*


# PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

## BRICKS, &c.

| | £ | s. | d. | |
|---|---|---|---|---|
| Hard Stocks | 1 | 7 | 0 | per 1000 alongside, in river. |
| Rough Stocks and Grizzles | 1 | 4 | 0 | " " " |
| Picked Stocks for Facings | 2 | 15 | 0 | " delivered. |
| Flettons | 1 | 5 | 0 | " at railway depôt. |
| Red Wire Cuts | 1 | 11 | 0 | " " " |
| Best Fareham Red | 3 | 12 | 0 | " " " |
| Best Red Pressed Ruabon Facing | 5 | 0 | 0 | " " " |
| Best Blue Pressed Staffordshire | 3 | 15 | 0 | " " " |
| Do. Bullnose | 4 | 0 | 0 | " " " |
| Best Stourbridge Fire Bricks | 3 | 14 | 0 | " " " |
| GLAZED BRICKS. | | | | |
| Best White and Ivory Glazed Stretchers | 12 | 0 | 0 | " " " |
| Headers | 11 | 0 | 0 | " " " |
| Quoins, Bullnose, and Flats | 16 | 0 | 0 | " " " |
| Double Stretchers | 19 | 0 | 0 | " " " |
| Double Headers | 16 | 0 | 0 | " " " |
| One Side and two Ends | 19 | 0 | 0 | " " " |
| Two Sides and one End | 20 | 0 | 0 | " " " |
| Splays, Chamferred, Squints | 20 | 0 | 0 | " " " |
| Best Dipped Salt Glazed Stretchers, and Header | 12 | 0 | 0 | " " " |
| Quoins, Bullnose, and Flats | 14 | 0 | 0 | " " " |
| Double Stretchers | 15 | 0 | 0 | " " " |
| Double Headers | 14 | 0 | 0 | " " " |
| One Side and two Ends | 15 | 0 | 0 | " " " |
| Two Sides and one End | 15 | 0 | 0 | " " " |
| Splays, Chamferred, Squints | 14 | 0 | 0 | " " " |
| Second Quality White and Dipped Salt Glazed | 2 | 0 | 0 | " less than best. |

## BRICKS, &c. (*continued*).

| | £ | s. | d. | |
|---|---|---|---|---|
| Thames and Pit Sand | | 6 | 6 | per yard, delivered. |
| Thames Ballast | | 5 | 0 | " " |
| Best Portland Cement | | 25 | 0 | per ton, " |
| Best Ground Blue Lias Lime | 19 | 0 | | " " |
| NOTE.—The cement or lime is exclusive of the ordinary charge for sacks. | | | | |
| Grey Stone Lime | | 11s. | 0d. | per yard, delivered. |
| Stourbridge Fireclay in sacks | | 27s. | 0d. | per ton at rly. dpt. |

## STONE.

| | £ | s. | d. | |
|---|---|---|---|---|
| BATH STONE—delivered on road waggons, Paddington Depôt | | 1 | 6½ | per ft. cube. |
| Do. do. delivered on road waggons, Nine Elms Depôt | | 1 | 8½ | " " |
| PORTLAND STONE (20 ft. average)— | | | | |
| Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf | 2 | 1 | | " " |
| White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf | 2 | 2½ | | " " |
| | s. | d. | | |
| Ancaster in blocks | 1 | 10 | | per ft. cube, deld. rly. depôt. |
| Beer " | 1 | 6 | | " " |
| Groenahill " | 1 | 10 | | " " |
| Darley Dale in blocks | 2 | 4 | | " " |
| Red Corsehill " | 2 | 2 | | " " |
| Closeburn Red Freestone | 2 | 0 | | " " |
| Red Mansfield " | 2 | 4 | | " " |
| YORK STONE—*Robin Hood Quality.* | | | | |
| Scappled random blocks. | 2 | 10 | | " " |
| 6 in. sawn two sides landings to sizes (under 40 ft. super.) | 2 | 3 | | per ft. super., " |
| 6 in. rubbed two sides ditto, ditto | 2 | 6 | | " " |
| 3 in. sawn two sides slabs (random sizes) | 0 | 11½ | | " " |
| 2 in. to 2½ in. sawn one side slabs (random sizes) | 0 | 7½ | | " " |
| 1½ in. to 2 in. ditto, ditto | 0 | 6 | | " " |
| HARD YORK— | | | | |
| Scappled random blocks. | 3 | 0 | | per ft. cube, " |
| 3 in. sawn two sides landings to sizes (under 40 ft. super.) | 2 | 8 | | per ft. super., " |
| 6 in. rubbed two sides ditto | 3 | 0 | | " " |
| 3 in. sawn two sides slabs (random sizes) | 1 | 2 | | " " |
| in. self-faced random flags | 0 | 5 | | " " |
| | s. | d. | | |
| Hopton Wood (Hard Bed) in blocks | 2 | 0 | | per ft. cube, deld. rly. depôt. |
| " " " 6 in. sawn both sides landings | 2 | 7 | | per ft. super. deld. rly. depôt. |
| " " " 3 in. sawn both sides random slabs | 1 | 0 | | " " |
| " " " 2 in. do. | 0 | 8½ | | " " |

## SLATES.

| In. In. | £ | s. | d. | |
|---|---|---|---|---|
| 20×10 best blue Bangor | 13 | 2 | 6 | per 1000 of 1200 at r. d. |
| 20×12 " " | 13 | 17 | 6 | " " |
| 20×10 first quality " | 13 | 0 | 0 | " " |
| 20×12 " " | 13 | 15 | 0 | " " |
| 16×8 " " | 7 | 5 | 0 | " " |
| 20×10 best blue Portmadoc | 12 | 12 | 6 | " " |
| 16×8 " " | 6 | 12 | 6 | " " |
| 20×10 best Eureka unfading green | 15 | 17 | 6 | " " |
| 20×12 " " | 18 | 7 | 6 | " " |
| 18×10 " " | 13 | 5 | 0 | " " |
| 16×8 " " | 10 | 5 | 0 | " " |
| 20×10 permanent green | 11 | 12 | 6 | " " |
| 18×10 " " | 9 | 12 | 6 | " " |
| 16×8 " " | 6 | 12 | 6 | " " |

## TILES.

| | s. | d. | |
|---|---|---|---|
| Best plain red roofing tiles | 42 | 0 | per 1000 at rly. depôt. |
| Hip and Valley tiles | 3 | 7 | per doz. " |
| Best Broseley tiles | 50 | 0 | per 1000 " |
| Do. Ornamental tiles | 52 | 6 | " " |
| Hip and Valley tiles | 4 | 0 | per doz. " |
| Best Ruabon red, brown, or brindled do. (Edwards) | 57 | 6 | per 1000 " |
| Do. Ornamental do. | 60 | 0 | " " |
| Hip tiles | 4 | 0 | per doz. " |
| Valley tiles | 3 | 0 | " " |
| Best Red or Mottled Staffordshire do. (Peakes) | 51 | 9 | per 1000 " |
| Do. Ornamental do. | 54 | 6 | " " |
| Hip tiles | 4 | 1 | per doz. " |
| Valley tiles | 3 | 8 | " " |
| Best "Rosemary" brand plain tiles | 48 | 0 | per 1000 " |
| Best Ornamental tiles | 50 | 0 | " " |
| Hip tiles | 4 | 0 | per doz. " |
| Valley tiles | 3 | 8 | " " |
| Best "Hartshill" brand plain tiles, sand-faced | 50 | 0 | per 1000 " |
| Do. pressed | 47 | 6 | " " |
| Do. Ornamental do. | 50 | 0 | " " |
| Hip tiles | 4 | 0 | per doz. " |
| Valley tiles | 3 | 6 | " " |

## WOOD.

| BUILDING WOOD. | At per standard. £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in. | 13 | 10 | 0 | 15 | 0 | 0 |
| Deals: best 3 by 9 | 13 | 0 | 0 | 14 | 0 | 0 |
| Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in. | 11 | 0 | 0 | 12 | 0 | 0 |
| Battens: best 2½ by 6 and 3 by 6 | 0 | 10 | 0 | less than 7 in. and 8 in. | | |
| Deals: seconds | 1 | 0 | 0 | less than best. | | |
| Battens: seconds | 0 | 10 | 0 | " | " | |
| 2 in. by 4 in. and 2 in. by 6 in. | 9 | 0 | 0 | 10 | 0 | 0 |
| 2 in. by 4½ in. and 2 in. by 5 in. | 8 | 10 | 0 | 9 | 10 | 0 |
| Foreign Sawn Boards— | | | | | | |
| 1 in. and 1¼ in. by 7 in. | 0 | 10 | 0 | more than battens. | | |
| ⅞ in. | 1 | 0 | 0 | " | | |

## WOOD (*continued*).

| BUILDING WOOD (*continued*). | At per load of 50 ft. £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| Fir timber: best middling Danzig or Memel (average specification) | 4 | 10 | 0 | 5 | 0 | 0 |
| Seconds | 4 | 0 | 0 | 4 | 10 | 0 |
| Small timber (8 in. to 10 in.) | 3 | 12 | 6 | 3 | 15 | 0 |
| Small timber (6 in. to 8 in.) | 3 | 0 | 0 | 3 | 10 | 0 |
| Swedish balks | 2 | 10 | 0 | 3 | 0 | 0 |
| Pitch-pine timber (30 ft. average) | 3 | 5 | 0 | 3 | 15 | 0 |

| JOINERS' WOOD. | At per standard. £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| White Sea: first yellow deals, 3 in. by 11 in. | 24 | 0 | 0 | 25 | 0 | 0 |
| 3 in. by 9 in. | 22 | 0 | 0 | 23 | 0 | 0 |
| Battens, 2½ in. and 3 in. by 7 in. | 16 | 10 | 0 | 18 | 0 | 0 |
| Second yellow deals, 3 in. by 11 in. | 18 | 10 | 0 | 20 | 0 | 0 |
| " " 3 in. by 9 in. | 17 | 10 | 0 | 19 | 0 | 0 |
| Battens, 2½ in. and 3 in. by 7 in. | 13 | 10 | 0 | 14 | 10 | 0 |
| Third yellow deals, 3 in. by 11 in. and 9 in. | 13 | 10 | 0 | 15 | 0 | 0 |
| Battens, 2½ in. and 3 in. by 7 in. | 11 | 0 | 0 | 12 | 0 | 0 |
| Petersburg: first yellow deals, 3 in. by 11 in. | 21 | 0 | 0 | 22 | 10 | 0 |
| Do. 3 in. by 9 in. | 18 | 0 | 0 | 19 | 10 | 0 |
| Battens | 13 | 10 | 0 | 15 | 0 | 0 |
| Second yellow deals, 3 in. by 11 in. | 16 | 0 | 0 | 17 | 0 | 0 |
| Do. 3 in. by 9 in. | 14 | 10 | 0 | 16 | 0 | 0 |
| Battens | 11 | 0 | 0 | 12 | 10 | 0 |
| Third yellow deals, 3 in. by 11 in. | 13 | 0 | 0 | 14 | 0 | 0 |
| Do. 3 in. by 9 in. | 12 | 10 | 0 | 14 | 0 | 0 |
| Battens | 10 | 0 | 0 | 11 | 0 | 0 |
| White Sea and Petersburg— | | | | | | |
| First white deals, 3 in. by 11 in. | 14 | 10 | 0 | 15 | 10 | 0 |
| " " 3 in. by 9 in. | 13 | 10 | 0 | 14 | 10 | 0 |
| Battens | 11 | 0 | 0 | 12 | 0 | 0 |
| Second white deals, 3 in. by 11 in. | 13 | 10 | 0 | 14 | 10 | 0 |
| " " 3 in. by 9 in. | 12 | 10 | 0 | 13 | 10 | 0 |
| " " battens | 10 | 0 | 0 | 11 | 0 | 0 |
| Pitch-pine: deals | 16 | 10 | 0 | 20 | 0 | 0 |
| Under 2 in. thick extra | 0 | 10 | 0 | 1 | 0 | 0 |
| Yellow Pine—First, regular sizes | 44 | 0 | 0 | upwards. | | |
| Oddments | | 0 | 0 | " | | |
| Seconds, regular sizes | 33 | 0 | 0 | " | | |
| Yellow Pine oddments | 28 | 0 | 0 | " | | |
| Kauri Pine—Planks, per ft. cube | 0 | 3 | 6 | 0 | 5 | 0 |
| Danzig and Stettin Oak Logs— | | | | | | |
| Large, per ft. cube | 0 | 3 | 0 | 0 | 3 | 6 |
| Small " " | 0 | 2 | 6 | 0 | 2 | 9 |
| Wainscot Oak Logs, per ft. cube | 0 | 5 | 0 | 0 | 5 | 6 |
| Dry Wainscot Oak, per ft. sup. as inch | 0 | 0 | 8 | 0 | 0 | 9 |
| ¼ in. do. do | 0 | 0 | 7 | — | | |
| Dry Mahogany—Honduras, Tabasco, per ft. super. as inch | 0 | 0 | 9 | 0 | 1 | 0 |
| Selected, Figury, per ft. super. as inch | 0 | 1 | 6 | 0 | 2 | 6 |
| Dry Walnut, American, per ft. super. as inch | 0 | 0 | 10 | 0 | 1 | 0 |
| Teak, per load | 17 | 0 | 0 | 22 | 0 | 0 |
| American Whitewood Planks, per ft. cube | 0 | 4 | 0 | 0 | 5 | 0 |
| Prepared Flooring, etc.— | Per square. | | | | | |
| 1 in. by 7 in. yellow, planed and shot | 0 | 13 | 6 | 0 | 17 | 6 |
| 1 in. by 7 in. yellow, planed and matched | 0 | 14 | 0 | 0 | 18 | 0 |
| 1¼ in. by 7 in. yellow, planed and matched | 0 | 16 | 0 | 1 | 0 | 0 |
| 1 in. by 7 in. white, planed and shot | 0 | 12 | 0 | 0 | 14 | 6 |
| 1 in. by 7 in. white, planed and matched | 0 | 12 | 6 | 0 | 15 | 0 |
| 1¼ in. by 7 in. white, planed and matched | 0 | 15 | 0 | 0 | 16 | 6 |
| ⅞ in. by 7 in. yellow, matched and beaded or V-jointed brds. | 0 | 11 | 0 | 0 | 13 | 6 |
| 1 in. by 7 in. " " | 0 | 14 | 0 | 0 | 18 | 0 |
| ⅞ in. by 7 in. white " " | 0 | 10 | 0 | 0 | 11 | 6 |
| 1 in. by 7 in. " " | 0 | 12 | 9 | 0 | 15 | 0 |

6 in. at 6d. to 9d. per square less than 7 in.

## JOISTS, GIRDERS, &c.

| | In London, or delivered Railway Vans, per ton. £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| Rolled Steel Joists, ordinary sections | 7 | 0 | 0 | 7 | 10 | 0 |
| Compound Girders, ordinary sections | 9 | 0 | 0 | 10 | 0 | 0 |
| Steel Compound Stanchions | 12 | 0 | 0 | 13 | 0 | 0 |
| Angles, Tees, and Channels, ordinary sections | 9 | 0 | 0 | 10 | 0 | 0 |
| Flitch Plates | 9 | 0 | 0 | 10 | 0 | 0 |
| Cast Iron Columns and Stanchions including ordinary patterns | 7 | 10 | 0 | 8 | 10 | 0 |

## METALS.

| | Per ton, in London. £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| IRON— | | | | | | |
| Common Bars | 8 | 0 | 0 | 8 | 10 | 0 |
| Staffordshire Crown Bars, good merchant quality | 8 | 10 | 0 | 9 | 0 | 0 |
| Staffordshire "Marked Bars" | 10 | 0 | 0 | — | | |
| Mild Steel Bars | 8 | 15 | 0 | 9 | 0 | 0 |
| Hoop Iron, basis price | 9 | 5 | 0 | 9 | 10 | 0 |
| " Galvanised | 17 | 0 | 0 | — | | |
| (*And upwards, according to size and gauge.) | | | | | | |
| Sheet Iron Black— | | | | | | |
| Ordinary sizes to 20 g. | 9 | 10 | 0 | — | | |
| " " 24 g. | 10 | 10 | 0 | — | | |
| " " 26 g. | 12 | 0 | 0 | — | | |
| Sheet Iron, Galvanised, flat, ordinary quality— | | | | | | |
| Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g. | 14 | 0 | 0 | — | | |
| Ordinary sizes to 22 g. and 24 g. | 14 | 10 | 0 | — | | |
| " " 26 g. | 15 | 0 | 0 | — | | |
| Sheet Iron, Galvanised, flat, best quality— | | | | | | |
| Ordinary sizes to 20 g. | 17 | 0 | 0 | — | | |
| " " 22 g. and 24 g. | 17 | 10 | 0 | — | | |
| " " 26 g. | 19 | 0 | 0 | — | | |
| Galvanised Corrugated Sheets— | | | | | | |
| Ordinary sizes 6 ft. to 8 ft. 20 g. | 13 | 10 | 0 | — | | |
| " " 22 g. and 24 g. | 14 | 0 | 0 | — | | |
| " " 26 g. | 15 | 5 | 0 | — | | |
| Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker | 11 | 10 | 0 | — | | |
| Best Soft Steel Sheets, 22 g. & 24 g. | 12 | 10 | 0 | — | | |
| " " 26 g. | 14 | 15 | 0 | — | | |
| Cut Nails, 3 in. to 6 in. | 9 | 10 | 0 | 9 | 15 | 0 |

(Under 3 in., usual trade extras.)

| LEAD, &c. | Per ton, in London. £ s. d. | £ s. d. |
|---|---|---|
| LEAD—Sheet, English, 3lb. and up. | 18 10 0 ... | — |
| Pipe in coils | 21 10 0 ... | — |
| Soil pipe | 21 10 0 ... | — |
| Compo pipe | | |
| ZINC—Sheet— | | |
| Vieille Montagne ton | 33 0 0 ... | — |
| Silesian | 32 10 0 ... | — |
| COPPER— | | |
| Strong Sheet per lb. | 0 1 0 ... | — |
| Thin " " | 0 1 1 ... | — |
| Copper nails " | 0 0 11 ... | — |
| BRASS— | | |
| Strong Sheet " | 0 0 11 ... | — |
| Thin " " | 0 1 0 ... | — |
| TIN—English Ingots " | 0 1 8 ... | — |
| SOLDER—Plumbers' " | 0 0 8 ... | — |
| Tinmen's " | 0 0 10 ... | — |
| Blowpipe " | 0 0 11 ... | — |

| ENGLISH SHEET GLASS IN CRATES. | 2½d. per ft. delivered. |
|---|---|
| 15 oz. thirds | 2½d. " " |
| " fourths | 3d. " " |
| 21 oz. thirds | 3d. " " |
| " fourths | 4d. " " |
| 26 oz. thirds | 4½d. " " |
| " fourths | 5d. " " |
| 32 oz. thirds | 4½d. " " |
| " fourths | 3½d. " " |
| Fluted Sheet, 15 oz. | 4d. " " |
| " 21 oz. | 2½d. " " |
| Hartley's Rolled Plate | 2d. " " |
| ½ " " " | 2½d. " " |
| ¾ " " " | 2½d. " " |
| Figured and Oxford Rolled | |
| Oceanic, etc. white | 4d. " " |
| " " " tinted | 5½d. " " |

| OILS, &c. | £ s. d. |
|---|---|
| Raw Linseed Oil in pipes per gallon | 0 1 10 |
| " " " in barrels " | 0 1 11 |
| " " " in drums " | 0 2 1 |
| Boiled " " in pipes " | 0 2 0 |
| " " " in barrels " | 0 2 1 |
| " " " in drums " | 0 2 3 |
| Turpentine in barrels " | 0 4 0 |
| " in drums " | 0 4 2 |
| Genuine Ground English White Lead per ton | 22 10 0 |
| Red Lead, Dry " | 21 10 0 |
| Best Linseed Oil Putty per cwt. | 0 7 0 |
| Stockholm Tar per barrel | 1 12 0 |

| VARNISHES, &c. | Per gallon. £ s. d. |
|---|---|
| Fine Pale Oak Varnish | 0 8 0 |
| Pale Copal Oak | 0 10 6 |
| Superfine Pale Elastic Oak | 0 12 6 |
| Fine Extra Hard Church Oak | 0 10 0 |
| Superfine Hard-drying Oak, for seats of Churches | 0 14 0 |
| Fine Elastic Carriage | 0 12 6 |
| Superfine Pale Elastic Carriage | 0 16 0 |
| Fine Pale Maple | 0 16 0 |
| Finest Pale Durable Copal | 0 18 0 |
| Extra Pale French Oil | 1 1 0 |
| Eggshell Flatting Varnish | 0 18 0 |
| White Copal Enamel | 1 4 0 |
| Extra Pale Paper | 0 12 0 |
| Best Japan Gold Size | 0 10 6 |
| Best Black Japan | 0 16 0 |
| Oak and Mahogany Stain | 0 9 0 |
| Brunswick Black | 0 8 6 |
| Berlin Black | 0 16 0 |
| Knotting | 0 10 0 |
| French and Brush Polish | 0 10 0 |

## TO CORRESPONDENTS.

J. & C. (drawings received).—H. & P. (received).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m.* on *Thursdays*. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

AYLESBURY.—For the erection of a pair of villas, Tring-road Aylesbury, for Messrs. Jones & Cocks. Mr. Fred Taylor, architect, Aylesbury:—

| | | | |
|---|---|---|---|
| G. & F. Cannon .. | £1,158 | Webster & Cannon* | £1,098 |
| Mayne & Son..... | 1,100 | | |

AYLESBURY.—For the erection and completion of grammar school, master's house, playing sheds, and fences, etc., in Walton-road, Aylesbury, for the Governors. Mr. Fred Taylor, architect, Aylesbury. Quantities by Messrs. W. T. Farthing & Son, 46, Strand, London:—

| | | | |
|---|---|---|---|
| J. Mead ..... | £9,130 | G. Darlington .... | £8,010 |
| Dennis & Co..... | 8,981 | A. Faulks ..... | 7,950 |
| Mayne & Son..... | 8,840 | Wallis & Son..... | 7,867 |
| R. Cleaver ..... | 8,750 | Lawrence & Son .. | 7,844 |
| F. Gough ..... | 8,394 | Hunt & Son ..... | 7,822 |
| Jackaman & Son .. | 8,185 | G. & T. Cannon .. | 7,765 |
| W. J. Bloxham.... | 8,150 | Webster & Cannon | 7,498 |
| T. Stimson..... | 8,069 | G. H. Gibson..... | 7,463 |
| Henson & Son .... | 8,050 | Hacksley Bros., | |
| Honour & Son .... | 8,044 | Wellingborough*.. | 7,228 |

BARNOLDSWICK.—For street works, part of Longfield-lane, for the Urban District Council. Mr. W. Bennett, Surveyor, Town Hall, Barnoldswick. Quantities by Surveyor:—

| | | | |
|---|---|---|---|
| W. Armstrong & Brown & Sharples .... | £219 16 8 | E. Smith, Barnoldswick* ..... | £155 0 0 |
| W. Sagar .... | 186 13 2 | | |
| W. J. J. McDonald .... | 184 11 9 | | |

BECKENHAM (Kent).—For the erection of a private residence at Hayes-lane, Beckenham. Mr. G. St. Pierre Harris, architect and surveyor, 8, Ironmonger-lane, E.C., and Orpington, Kent:—

| | | | |
|---|---|---|---|
| T. Graham..... | £4,668 | J. E. Arnaud & Son | £4,284 |
| Perry Bros. ..... | 4,494 | J. Duthoit ..... | 4,197 |
| T. Crossley & Son.. | 4,386 | Somerford & Son .. | 4,190 |
| Hudson Bros. .... | 4,330 | T. W. Graty‡..... | 4,155 |

‡ Accepted subject to modification.

BEXLEY HEATH (Kent).—For the erection of a small villa. Mr. G. St. Pierre Harris, architect and surveyor, 8, Ironmonger-lane, E.C., and Orpington, Kent:—

A. Feakes*..... £415 7

BRADFORD.—For erecting chapel and schools, Shearbridge-road, for the trustees of the late Mannville Chapel. Mr. E. H. Parkinson, architect and surveyor, Queensgate-chambers, Bradford:—

*Mason and Joiners:* J. Moulson & Son, Ltd., Bradford.....
*Plumbers:* Atkinson & Smith, Frizinghall ..... } £5,556 14 5
*Plasterers:* C. Marsden & Son, Bradford
*Tiler:* T. Thornton, Shipley .....
*Painter:* J. C. Calvert, Bradford ....

BUCKINGHAM.—For additions to the National Schools, Lillingstone Lovell, for the Managers. Mr. Fred Taylor, architect, Aylesbury:—

J. T. Marshall ..... £292 0 0

CANWELL (Staffs).—For further alterations and additions to the Hall, for Mr. Philip S. Foster. Mr. C. M. C. Armstrong, architect, 5, High-street, Warwick:—

| | | | |
|---|---|---|---|
| G. Hodges ..... | £2,649 | W. J. Whittall & Son, | |
| W. & J. Webb .... | 2,521 | Birmingham* .... | £2,371 |

CASTLEREA (Co. Roscommon).—For constructing houses, weir sluices, and water course (Ballaghaderreen Electric Lighting Works), for the Rural District Council. Mr. Christopher Mulvany, engineer, Athlone:—

| | | | |
|---|---|---|---|
| McKee & McNally ..... | £1,953 3 4 | J. Clarence, Ballisodare, Co. Sligo* .. | £1,130 0 0 |
| | | J. Regan‡ .... | 894 0 0 |

‡ Informal.

CHELTENHAM.—For erecting new school buildings to accommodate 1,100 children, for the Naunton Park district, for the Education Committee. Messrs. Chatters & Smithson, architects, 17, Regent-street, Cheltenham:—

| | | Time, Months. |
|---|---|---|
| W. T. Bloxham..... | £15,797 | 12 |
| Pethick Bros..... | 15,744 | 12 |
| Wilkins & Son ..... | 15,238 | 15 |
| J. Gutteridge ..... | 15,200 | 9 |
| Lane & Son..... | 14,969 | 12 |
| Long & Sons ..... | 14,930 | 20 |
| H. Smith..... | 14,633 | 12 |
| E. Walters & Sons..... | 14,500 | — |
| R. Skemp ..... | 14,475 | — |
| Estcourt & Sons..... | 14,440 | 18 |
| Channon & Son ..... | 14,250 | — |
| Billings & Sons ..... | 14,157 | — |
| W. Jones..... | 14,100 | 18 |
| L. Jones ..... | 13,998 | — |
| Bowers & Co. ..... | 13,985 | 15 |
| Parnell & Son..... | 13,969 | 12 |
| Dallow & Sons ..... | 13,725 | 14 |
| Collins & Godfrey ..... | 13,477 | — |
| T. Cuthbert..... | 13,150 | 12 |
| C. Moss ..... | 13,088 | 9 |
| Eastwood ..... | 12,855 | — |
| C. Wright ..... | 12,777 | 12 |
| W. Crane, Nottingham* .. | 12,587 | — |

CHISLEHURST (Kent).—For the erection of a motor garage at private residence. Mr. G. St. Pierre Harris, architect and surveyor, 8, Ironmonger-lane, E.C., and Orpington:—

| | | | |
|---|---|---|---|
| T. Rider & Son..... | £615 | R. Lowe ..... | £536 |
| T. Knight ..... | 575 | T. D. Graty* ..... | 519 |

CHISLEHURST (Kent).—For the execution of certain decorative repairs to private residence. Mr. G. St. Pierre Harris, architect and surveyor, 8, Ironmonger-lane, E.C., and Orpington:—

Warings*..... £562 10

CRAYFORD (Kent).—For the execution of certain decorative repairs to business properties. Mr. G. St. Pierre Harris, architect and surveyor, 8, Ironmonger-lane, E.C., and Orpington, Kent:—

| | | | |
|---|---|---|---|
| H. Dunn ..... | £316 0 | Ellingham & Son | £264 11 |
| W. & A. Smith .. | 283 15 | T. Knight ..... | 247 0 |

DORKING.—For alterations and additions to "Westcott Hall," for Mr. C. J. Wills. Mr. A. W. Venner, architect, Redhill:—

| | | | |
|---|---|---|---|
| King & Son ..... | £1,568 | Cummins & Sons, | |
| A. B. Apted ..... | 1,519 | Ltd., Dorking* .. | £1,475 |
| | | A. B. Wiles‡ ..... | 1,150 |

‡ Withdrawn.

DARWEN (Lancashire).—For the erection of a Carnegie free library, for the Darwen Corporation. Messrs. Haywood & Harrison, architects, Accrington and Lytham. Quantities by the architects:—

| | |
|---|---|
| Higson & Sons..... | £12,150 0 0 |
| S. Wilson..... | 11,963 0 0 |
| J. Whittaker & Sons ..... | 11,947 10 0 |
| Platt & Castle ..... | 11,938 19 2 |
| J. C. & F. Woods ..... | 11,689 0 0 |
| Hannibal Ramsbottom ..... | 11,550 0 0 |
| S. Butterworth & Sons ..... | 11,522 0 0 |
| T. Lightbown ..... | 11,405 11 0 |
| T. Cottam ..... | 10,990 0 0 |
| Lloyd & Millward ..... | 10,826 0 0 |
| R. Shorrock, Darwen* ..... | 10,730 0 0 |

GUSTON.—For erecting the Duke of York's Royal Military School at Guston, near Dover, for the Commissioners of H.M. Works and Public Buildings:—

| | | | |
|---|---|---|---|
| T. L. Fearon .... | £154,395 | J. Shelbourne & Co. ..... | £124,200 |
| R. & G. Bresley | 134,500 | F. Miskin, Ltd... | 119,884 |
| Perry & Co. .... | 134,500 | T. J. Hawkins & Co. ..... | 118,350 |
| W. F. Blay .... | 133,500 | G. E. Wallis & Sons, Ltd. .... | 118,240 |
| F. Gough & Co... | 132,000 | W. Moss & Sons, Ltd..... | 117,300 |
| F. & H. F. Higgs | 130,900 | J. E. Johnson & Son ..... | 117,250 |
| G. Browning.... | 129,800 | G. H. Denne & Son | 116,400 |
| J. Mowlem & Co., Ltd..... | 129,590 | W. Willett ..... | 115,500 |
| J. & M. Patrick.. | 129,000 | J. J. Wise ..... | 115,000 |
| D. Davies & Sons | 128,910 | C. Gray Hill .... | 114,990 |
| Higgs & Hill, Ltd. | 128,400 | Martin, Wells, & Co., Ltd..... | 114,000 |
| T. H. Kingerlee & Sons..... | 127,593 | T. J. Denne .... | 112,900 |
| W. King & Son.. | 127,474 | C. Wall, Ltd..... | 111,515 |
| W. Pattinson & Sons, Ltd. .... | 126,558 | A. Hudson & Co. | 107,789 |
| Holloway Bros., (London), Ltd. | 126,300 | | |

HIGHWORTH (Wilts).—For alterations, etc., at the Fox Inn, for Messrs. T. and J. Arkell. Messrs. Drew & Sons, architects, Regent-circus, Swindon:—

P. Chick, Highworth* ..... £109

INGATESTONE.—For erecting an engine house, constructing a small covered service reservoir and other works, for the Chelmsford Rural District Council. Mr. J. Dewhirst, Engineer, Avenue Chambers, Market-road, Chelmsford:—

| | | | |
|---|---|---|---|
| F. C. Thompson..... | £1,888 12 0 | Choat & Sons | £1,508 0 0 |
| G. Double.... | 1,820 3 0 | P. Green, Ingatestone*.. | 1,497 10 0 |
| J. Jackson .. | 1,789 0 0 | Executors of J. Arundel... | 1,422 0 3 |
| H. Shardlow.. | 1,750 0 0 | | |
| S. Redhouse, sen. ..... | 1,698 2 4 | | |

ISLEWORTH.—For making-up part of Alexandra-road, for Heston and Isleworth Urban District Council. Mr. P. G. Parkman, Engineer and Surveyor, Council House, Hounslow. Quantities by Engineer and Surveyor—

T. Chapman ..... £186 15 11

KING'S LYNN.—For pulling down and rebuilding Nos. 43 and 44, High-street, King's Lynn. Messrs. A. R. Calvert & W. R. Gleave, architects, Nottingham:—

G. Hopewell & Son, Nottingham* ..... £2,050
[Lowest of nine tenders.]

LEVENSHULME.—For erecting a new elementary school at Errwood-road, for Lancashire Education Committee. Mr. Henry Littler, County Architect, 16, Ribblesdale-place, Preston:—

| | |
|---|---|
| A. & E. Oakes ..... | £13 158 15 7 |
| J. & J. Parish ..... | 12,568 12 0 |
| J. Briggs..... | 11,714 0 0 |
| T. & W. Meadows..... | 11,540 0 0 |
| Young, Tinker, & Young..... | 11,355 0 0 |
| R. Carlyle ..... | 11,284 0 0 |
| Normanton & Sons ..... | 11,282 0 0 |
| J. Ramsbottom..... | 11,250 0 0 |
| S. Robinson & Sons ..... | 11,230 0 0 |
| J. Chapman & Sons ..... | 11,159 0 0 |
| Burgess & Galt ..... | 11,100 0 0 |
| R. Neill & Sons..... | 11,096 0 0 |
| W. A. Peters & Sons..... | 10,959 0 0 |
| Gerrard & Sons..... | 10,757 0 0 |
| J. Tinline, Bury* ..... | 10,750 0 0 |

LITTLE BROMLEY.—For erecting a new school and teacher's house at Little Bromley, near Ardleigh, for Essex Education Committee. Mr. F. Whitmore, County Architect, Duke-street, Chelmsford:—

Saunders & Son, Dedham, Colchester* .. £925

LONDON.—For reconstructing the swing-bridge carrying Old Gravel-lane over the entrance to the East London Dock, for the London County Council:—

| | |
|---|---|
| J. Westwood & Co., Ltd..... | £19,946 12 3 |
| A. Findlay & Co., Ltd..... | 18,803 6 10 |
| J. Cochrane & Sons ..... | 17,538 18 6 |
| J. Butler & Co.'s Trustees ..... | 16,992 2 0 |
| Muirhead, Greig, & Matthews.... | 16,889 7 7 |
| A. Handyside & Co., Ltd. ..... | 16,794 9 9 |
| Cleveland Bridge and Engineering Co., Ltd..... | 16,790 11 11 |
| Gray's Steel Constructional Co., Ltd..... | 16,786 0 0 |
| A. Fasey & Son..... | 16,284 8 0 |
| Heenan & Froude, Ltd. ..... | 15,228 12 1 |
| A. Thorne, London*..... | 14,573 0 0 |

[The estimate, comparable with the above tenders, is £15,522 17 3.]

[Mr. A. Thorne to sub-let to the undermentioned firms (or to such other persons or firms as may be approved by the engineer under the contract) the undermentioned portions of the work—the manufacture of the metal work to the Horseley Co., Ltd., the Cleveland Bridge and Engineering Co., Ltd., A. Handyside & Co., A. Findlay & Co., the Phœnix Foundry Co., Dorman, Long, & Co., or Joseph Westwood & Co.; the manufacture of the electrical equipment to Crompton & Co., Ltd., the Bush Electrical Engineering Co., Ltd., or R. W. Blackwell & Co., Ltd.]

TENDERS—*Continued on page 247.*

# List of Contracts, etc.

## COMPETITION.

| Nature of Work. | By whom Required. | Premiums. | Designs to be delivered |
|---|---|---|---|
| *DESIGNS FOR ALTERATION OF BUILDINGS TO SHOPS .... | J. H. Batten ..... | 25*l*. ..... | No date. |

## CONTRACTS.

*(For some Contracts still open, but not included in this List, see previous issues.)*

| Nature of Work or Materials. | By whom Advertised. | Forms of Tender, etc., supplied by | Tenders to be delivered |
|---|---|---|---|
| Sewage Works, Harley, Wentworth ..... | Rotherham R.D.C..... | J. Platts, Surveyor, High-street, Rotherham ..... | Mar. 6 |
| Cartage Works..... | Staines R.D.C. ..... | Surveyor, London-road, Ashford, Middlesex ..... | do. |
| Removing and Refixing Cornish Boilers ..... | King's Norton, etc., U.D.C. .. | Surveyor's Office, 23, Valentine-road, King's Heath ..... | do. |
| Seats for Chapel at Workhouse, Gravelly-hill..... | Aston Guardians ..... | C. Whitwell & Son, Architects, 23, Temple-row, Birmingham | do. |
| Alterations, etc., at Witton Hall, Witton ..... | do. | J. North, Clerk, Union Offices, Vauxhall-road, Birmingham | do. |
| 273 lineal yds. of Red Deal Fencing, etc., Bitton Estate ..... | Teignmouth U.D.C. ..... | C. F. Gettings, Surveyor, Town Hall, Teignmouth ..... | do. |
| Remaking Streets, Bangor..... | Bangor U.D.C. ..... | J. Milliken, Clerk, Town Hall, Bangor..... | do. |
| Whinstone, Slag, etc. ..... | Sunderland R.D.C..... | T. Young, Surveyor, 17, John-street, Sunderland ..... | do. |
| Copper Boiler, Heating Apparatus, etc., at Laundry, Runninghill. | Saddleworth Guardians..... | Master of Workhouse, Runninghill, Dobcross..... | do. |
| *WORKS AND MATERIALS ..... | Willesden D.C. ..... | Council's Engineer, Dyne-road, Kilburn, N.W. ..... | do. |
| Street Works, Victoria-street, Failsworth ..... | Failsworth U.D.C. ..... | Surveyor's Office, Town Hall, Failsworth ..... | Mar. 7 |
| Making-up Leighton-road, Bush Hill Park..... | Enfield U.D.C. ..... | R. Collins, Surveyor, Public Offices, Enfield ..... | do. |
| Stone, etc..... | Northampton R.D.C..... | W. Tomalin, Clerk, 14, Guildhall-road, Northampton ..... | do. |
| Cattle Market, St. Columb Major, Cornwall..... | Cattle Market Co., Ltd. .... | Office of Company, Fore-street, St. Columb ..... | do. |
| Rag Warehouse, Parkfield Mills, Fountain-street, Morley ..... | J. Brumfitt & Son ..... | T. A. Buttery & S. B. Birds, Architects, Queen-street, Morley | do. |
| School Desks..... | Manchester Education Comm. | Offices in Deansgate, Manchester ..... | do. |
| Mixed and Infants' School, Blaengwrach..... | Glamorgan County Council .. | T. M. Franklin, Clerk, Westgate-street, Cardiff ..... | do. |
| Improvements at Llancarfan Council School ..... | do. | do. | do. |
| Teachers' Rooms, etc., Port Talbot School..... | do. | do. | do. |
| Alterations, etc., to Brithdir Council School ..... | do. | do. | do. |
| Alterations, etc., to Troedrhiwfuwch School ..... | do. | do. | do. |
| Stores, etc. ..... | Birmingham Gas Department | G. H. Barber, City Gas Offices, Council House, Birmingham | Mar. 8 |
| Road Metal, Cartage, etc. ..... | Durham County Council .... | Surveyor, Shire Hall, Durham ..... | do. |
| 60 tons of Cast-iron Pipes, etc. ..... | Lanarkshire Middle Ward Com. | J. & A. Leslie & Reid, C.E., 72A, George-street, Edinburgh.. | do. |
| Filters and Tank, etc., Stoneymeadow..... | do. | do. | do. |
| Roadmaking, Kerbing, Paving, etc. ..... | Hackney Borough Council .. | Norman Scorgie, Borough Engineer, Town Hall, Hackney.. | do. |
| Limestone Channelling, Kerbing and Paving, Compton, Gifford.. | Plympton St. Mary R.D.C. .. | M. W. Wickett, Surveyor, Ridgway, Plympton..... | do. |
| Paving and Flagging ..... | Leeds Highways Committee.. | City Engineer's Office, Municipal-buildings, Leeds ..... | do. |
| Sewering and Paving of Back Bowes-street, Waterloo ..... | Cowpen U.D.C. ..... | R. Grieves, Surveyor, Seaforth-street, Waterloo, Blyth .... | do. |
| Granite and Stone ..... | Chorlton, etc., Workho. Comm. | J. Macdonald, Poor Law Offices, New Bridge-st., Manchester | Mar. 9 |
| Building Materials, etc. ..... | Cardiff Guardians ..... | A. J. Harris, Clerk, Queen's-chambers, Cardiff ..... | do. |
| Stores and Materials ..... | Carlisle Corporation ..... | H. C. Marks, City Engineer, 36, Fisher-street, Carlisle ..... | do. |
| Vertical Cross-Compound Condensing Engine..... | Huddersfield Corporation.... | K. F. Campbell, Engineer, Town Hall, Huddersfield..... | do. |
| One 750 Kilowat Traction Generator, etc. ..... | do. | do. | do. |
| Granite ..... | Market Harborough R.D.C. .. | W. H. Blount, Surveyor, Laughton, Rugby ..... | do. |
| Cartage of Stone ..... | Atcham R.D.C. ..... | T. Fortune, Surveyor, Pontesbury, Shrewsbury ..... | do. |
| Additions to Golf Club House, Ogden ..... | ..... | J. F. Walsh & G. Nicholas, Architects, Museum-chbrs., Halifax | do. |
| Converting Cottages at King's Cross, Halifax, into Shops..... | ..... | Jackson & Fox, Architects, Halifax..... | do. |
| Materials ..... | Casford R.D.C. ..... | A. Newman, Clerk, Hadleigh, Suffolk ..... | do. |
| Alterations at Union Infirmary, Hope, Eccles ..... | Salford Guardians ..... | H. Lord, Architect, 42, Deansgate, Manchester ..... | Mar. 10 |
| Laying Drains, etc., at Union Infirmary, Hope, Eccles..... | do. | do. | do. |
| Road Materials..... | Riccall R.D.C. ..... | E. Townend, Clerk, 1, Abbey-place, Selby ..... | do. |
| Alterations, etc., to Brointon Manor House, Brointon ..... | ..... | Groome & Bettington, Architects, Palace-chambers, Hereford | do. |
| Carting Materials ..... | Cambs. County Council..... | J. Papworth, Landbeach, Cambs. ..... | do. |
| Carting Stone, etc. ..... | Stafford R.D.C. ..... | W. Morgan, 4, Martin-street, Stafford..... | do. |
| Slag ..... | do. | do. | do |
| Broken Slag for Roads ..... | Clown R.D.C. ..... | J. T. Pears, Surveyor, Hollin Hill, Clown, Chesterfield..... | do. |
| Extension of Boardroom, etc., Bakewell ..... | Bakewell Guardians ..... | E. M. Longsdon, Architect, Town Hall, Bakewell ..... | do. |
| Steam Boiler and Heating Apparatus ..... | do. | do. | do. |
| Additions to Boothwood Paper Mills, Riskworth ..... | ..... | C. F. L. Horsfall & Son, Architects, Lord-st.-chbrs., Halifax | do. |
| Broken Slag for Roads ..... | Kiveton Park R.D.C..... | J. P. Evans, Surveyor, Kiveton Park Station, Sheffield .... | do. |
| Materials ..... | Eastbourne Town Council.... | Borough Surveyor, Town Hall, Eastbourne ..... | do. |
| Materials ..... | Eccles Corporation..... | T. T. Picton, Borough Surveyor, Town Hall, Eccles ..... | do. |
| Tools, etc. ..... | Kent Bridges, etc., Committee | County Surveyor, West Borough-chambers, Maidstone .... | do. |
| Annual Contracts..... | Hoylake & West Kirby U.D.C. | Engineer and Surveyor, Town Hall, Hoylake..... | do. |
| *COMPLETION OF TRANSEPTS, ETC., CHURCH, S.W. DIST. | The Committee ..... | Rowland, Plumbe, & Harvey, Archs., 13, Fitzroy-sq., W... | do. |
| Annual Contracts ..... | Gainsborough U.D.C. ..... | Engineer and Surveyor, Council Offices, Gainsborough..... | Mar. 12 |
| Materials ..... | Colne Corporation ..... | T. H. Hartley, Borough Surveyor, Town Hall, Colne ..... | do. |
| Granite and Slag ..... | Lichfield R.D.C..... | C. O. Bawstron, District Surveyor, Lichfield ..... | do. |
| Carting, Tools, Oils ..... | do. | do. | do. |
| Sewage Outfall Works, Fleckney ..... | Market Harborough R.D.C. .. | Everard, Son, & Pick, Engineer, 6, Millstone-lane, Leicester | do. |
| Business Premises, South-street, Elgin..... | ..... | R. S. Pratt, Architect, Town and County Bnk.-bldngs., Elgin | do. |
| Sewerage Works ..... | Darvel Town Council..... | P. C. Hart, C.E., 134, St. Vincent-street, Glasgow..... | do. |
| Materials, Electricity Supply Department ..... | Edinburgh Corporation..... | Engineer's Office, 5, Dewer-place, Edinburgh..... | do. |
| Stones and Sand ..... | Leeds Tramway Committee .. | J. B. Hamilton, Tramways Office, City-square, Leeds ..... | do. |
| Furniture and Fittings for Libraries, Selly Oak, etc..... | King's Norton, etc., U.D.C. .. | E. Docker, Clerk, 10, Newhall-street, Birmingham ..... | do. |
| Private Street Works ..... | Morley Highways Committee | W. E. Putman, Borough Engineer, Town Hall, Morley .... | do. |
| Materials ..... | Erith U.D.C. ..... | C. H. Fry, Clerk, Council Offices, Erith ..... | do. |
| Granite, Kerb, and Channel ..... | Broadstairs, etc., U.D.C. .... | H. Hurd, C.E., Town Surveyor, Broadstairs ..... | do. |
| Furniture at Lee Mount Infants' and Salterhebble Schools ..... | Halifax Education Committee | J. Lord, Borough Engineer, Town Hall, Halifax ..... | do. |
| *ERECT., SECONDARY SCH. AT SILDOWN, POOLE, DORSET | Poole Education Committee.. | G. A. Bligh Livesay, Fir Vale-chmb., Old C'stch.-rd., B'mouth. | do. |
| Jobbing Repairs, Workhouse, etc..... | Liverpool Select Vestry..... | H. J. Hagger, Parish Offices, Brownlow-hill, Liverpool..... | do. |
| Whinstone Metal, Gravel, Sand from Dunduff Quarry ..... | Lanark Middle Ward Dist. Com. | W. L. Douglas, C.E., District Offices, Hamilton..... | Mar. 13 |
| Granite and Granite Chippings ..... | Long Crendon R.D.C..... | E. Parry, Surveyor, Long Crendon, Thame..... | do. |
| Slag for Roads ..... | Blyth and Cuckney R.D.C. .. | F. Hopkinson, Surveyor, 40, Bridge-street, Worksop ..... | do. |
| Infant School, High-street, Over ..... | Winsford, etc., Sub-committee | H. Beswick, County Architect, Newgate-street, Chester .... | do. |
| Making Back Passage Leading from Hewitt-street ..... | Crewe Town Council ..... | G. Eaton-Shore, Borough Surveyor, Earle-street, Crewe .... | do. |
| Service Reservoir (500,000 Gallons) ..... | Nuneaton, etc., U.D.C. ..... | F. C. Cook, Waterworks Engineer, Council Offices, Nuneaton | do. |
| *CONSTRUCT. OF ROADS, ETC., PITSHANGER EST., EALING | The Trustees ..... | Hall, Jones, & Cummings, 41, Broadway, Ealing, W. ..... | do. |
| Materials ..... | Newcastle-on-Tyne Corp. .... | City and Engineer's Office, Town Hall, Newcastle-on-Tyne .. | Mar. 14 |
| Road Material and Cartage ..... | Tutbury R.D.C. ..... | C. F. Chamberlin, Clerk, Union Offices, Burton-upon-Trent | do. |
| Whinstone Metal ..... | ..... | H. Hutcheson, 115, Wellington-street, Glasgow..... | do. |
| *NEW POST OFFICE AT WARRINGTON ..... | H.M. Works ..... | H.M. Office of Works, Storey's-gate, Westminster, S.W. .... | do. |
| *WORKS AND MATERIALS ..... | Fulham Borough Council .... | Town Clerk, Town Hall, Fulham, S.W. ..... | do. |
| *EXTERNAL PAINT. AND REPAIRS, NORWOOD SCHOOLS | Lambeth Guardians ..... | Guardians' Offices, Brook-street, Kennington-road, S.E..... | do. |
| Cleaning, Painting, etc., Police-stations ..... | Leeds Corporation ..... | City Engineer's Office, Leeds..... | Mar. 15 |
| Materials ..... | do. | do. | do. |
| Effluent Conduit ..... | Merthyr Tydfil, etc. Farms Com. | T. F. Harvey, Borough Engineer, Town Hall, Merthyr Tydfil | do. |
| Mission House and Home, Newport..... | Clewer Sist., St. Jhn. Bap. Com. | W. Bucknell, Arc., 123, Knight's Hill-rd., W. Norwood, Lon. | do. |
| Materials and Work ..... | Croydon R.D.C. ..... | E. J. Gowen, Clerk, Town Hall, Croydon..... | do. |
| *EXTENSION OF SLIPPER BATHS, LATIMER-ROAD ..... | Wimbledon Corporation .... | Borough Surveyor, Town Hall, Wimbledon, S.W..... | do. |
| Paving, etc., Playgrounds of Thaxted School ..... | Essex Education Committee.. | At the School, Thaxted ..... | Mar. 16 |
| Farm Dwelling-house at Smirack, Enzie ..... | Gordon-Richmond Estates .. | Estates Office, Fochabers, N.B..... | do. |
| Farm Dwelling-house at Muir of Holmie, Rathven ..... | do. | do. | do. |
| Farm Dwelling-house at Ryeriggs, Bellie ..... | do. | do. | do. |
| Painting Iron Bridges, Thirlmere Aqueduct ..... | Manchester Corporation .... | Secretary, Waterworks Offices, Town Hall, Manchester .... | do. |
| Boys' School, Georgetown ..... | Merthyr Tydfil Educatn. Com. | J. L. Smith, Architect, Central-chambers, High-st., Merthyr | do. |

## CONTRACTS.—*Continued.*

| Nature of Work or Materials. | By whom Advertised. | Forms of Tender, etc., supplied by | Tenders to be delivered |
|---|---|---|---|
| Waterworks, Billinghay, etc. | Sleaford R.D.C. | W. B. Marsden, Engineer, 74, Southgate, Sleaford | Mar. 17 |
| 9½ miles of Cast-iron Mains, etc., for Billinghay Waterworks | do. | do. | do. |
| Road Metal | Spennymoor U.D.C. | C. R. Spencer, Surveyor, Spennymoor | do. |
| Materials | Burnley Highways Committee | G. H. Pickles, Borough Engineer, Town Hall, Burnley | do. |
| *MAKING-UP PRIVATE STREETS | Southgate U.D.C. | Council's Surveyor, Palmers-green, N. | do. |
| Chapel and School at Booth Town, Halifax | ..... | C. F. L. Horsfall & Son, Archs., Lord-st.-chbrs., Halifax | Mar. 19 |
| Elementary School for Eighty, Great Wratting | West Suffolk Educ. Com. .. | 5, Crown-street, Bury St. Edmunds | Mar. 20 |
| Enlargement of Haverhill Council School | do. | do. | do. |
| Gasholder Foundations, Bangor | Bangor U.D.C. | J. Milliken, Clerk, Town Hall, Bangor | do. |
| Flints and Granite | Tendring R.D.C. | J. Bell, Highway Surveyor, Great Bentley, Colchester | do. |
| Maintenance of Roads | Strood R.D.C. | J. E. Povey, Clerk, Union Offices, Strood | Mar. 21 |
| Steam Rolling, Scarifying, etc. | do. | do. | do. |
| Materials | do. | do. | do. |
| 250 yds. of Local Pit Flints | do. | do. | do. |
| Materials | Hoo R.D.C. | R. P. Smyth, Clerk, Strood | do. |
| Annual Contracts | Bredbury and Romiley U.D.C. | Surveyor, School Brow, Bredbury | do. |
| *SCH. BLDGS. AT CHILDREN'S HOMES, CHIPPING ONGAR | Hackney Union | Clerk's Office, Hackney Union, Homerton, N.E. | do. |
| *ADDITIONS, ETC., TO MARGARET RD. SCHOOL, E. BARNET | Herts County Council | County Surveyor, Hatfield | do. |
| *ADDITIONS AND ALTERATIONS TO SCHOOL, ST. ALBANS | do. | do. | do. |
| *NEW SCHOOL AND COOKERY CENTRE, BUSHEY | do. | do. | do. |
| Street at Abertridwr, near Caerphilly | ..... | G. A. Lundie, Surveyor, 53, Queen-street, Cardiff | Mar. 25 |
| Electric Lighting and Power, Longrove Asylum, Epsom | Asylums Committee of L.C.C. | Clerk of Committee, 6, Waterloo-place, London, S.W. | Mar. 26 |
| Heating Two New Blocks, Clonmel Asylum | ..... | J. F. Fuller, Architect, 179, Gt. Brunswick-street, Dublin .. | do. |
| *CONSTRUCTING SEWERS, ETC. | Barnet U.D.C. | Council's Surveyor, 40, High-street, Barnet | Mar. 27 |
| Elementary Schools, Commonside-lane, Ansdell, Lytham | Lancashire Education Com. | H. Littler, County Architect, 16, Ribblesdale-place, Preston. | April 2 |
| Tramway Rails | Dublin Corporation | F. J. Allan, Secretary, 3, Cork-hill, Dublin | No date. |
| Residence, Seascole | G. R. Burnett | W. L. Mason, Architect and Surveyor, Ambleside | do. |
| Bridge in Ferro-concrete, over Canal at Firgrove | Rochdale Corporation | Borough Surveyor, Town Hall, Rochdale | do. |
| Alterations, etc., to Triley Court, Abergavenny | Major Sanford | R. A. Johnson, Architect, Abergavenny | do. |
| Covering Pipes, etc., with Non-conducting Material | West Riding Asylum, Wadsley | J. W. Cotterill, at the Asylum, Wadsley, near Sheffield | do. |
| *ERECTING PORTION OF CHURCH AT BECKENHAM | Rector and Churchwardens .. | A. H. Hoole, 36, Great James-street, Bedford-row, W.C. | do. |
| *REPAIRS, ETC., COSBY CHURCH, NEAR LEICESTER | The Committee | H. Cayley, Bank-chambers, Rothwell, Kettering | do. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Salary. | Applications to be in |
|---|---|---|---|
| *SURVEYOR'S ASSISTANT | Beckenham U.D.C. | 100*l.* per annum | Mar. 13 |
| *ASSISTANT EXAMINERS IN PATENT OFFICE | Civil Service Commission | Not stated | Apr. 5 |
| *SUPERVISOR OF ROAD-MAKING | Brit. Central African Protect. | 200*l.*, etc., per annum | No date. |

## AUCTION SALES.

| Nature and Place of Sale. | By whom Offered. | Date of Sale. |
|---|---|---|
| *SURPLUS BUILDER'S PLANT, OLD KENT-ROAD, S.E.—469, Old Kent-road, S.E. | H. J. Bromley | Mar. 5 |
| *WOODWORK. AND CONTR'S. MACHINERY, ETC.—Stanley Bdge. Saw Mills, King's-road, S.W. | J. T. Skelding | Mar. 6, etc. |
| *DEALS, BATTENS, ETC.—Great Hall, Winchester House, Old Broad-street, E.C. | Churchill & Sim | Mar. 7 |
| *BRICKMAKING PLANT, BUSH HILL PARK BRICKFIELDS, ENFIELD—On the Land | Alfred Bowyer | Mar. 8 |
| *BUILDER'S, IRONFOUNDER'S, ETC., STOCK-IN-TRADE—18-20, Southwark Bridge-rd., S.E. | H. W. Smith | Mar. 12 |
| *STONE WHARF AND CONTENTS, REGENT'S PARK BASIN, N.W.—At the Mart | Rutley, Son, & Vine | Mar. 13 |
| *BUILDING LAND—Torrington Arms Hotel, North Finchley, N. | C. Sparrow & Sons | Mar. 26 |
| *FREEHOLD BUILDING SITES—Torrington Arms Hotel, North Finchley, N. | do. | do. |
| *BUILDING SITE, HAYMARKET, S.W. | May & Rowden | Mar. 29 |
| *ILFORD, BARKINGSIDE, FREEHOLD LAND AND COTTAGES—At the Mart | Alfred Savill & Sons | Mar. 30 |
| *FREEHOLD BUILDING LAND, SHEERNESS—At the Mart, E.C. | Tuckett & Son | Apr. 2 |
| *THE HOLBORN TOWN HALL, GRAY'S INN-ROAD, W.C.—At the Mart, E.C. | Jones, Lang, & Co. | Apr. 9 |

* *Those with an asterisk are advertised in this number*: *Competitions*, iv.; *Contracts*, iv. vi. viii. x.; *Public Appointments*, xx.; *Auction Sales*, xxxiv.

### TENDERS.—*Continued from page* 245.

LONDON.—For erecting a new sorting office at Peckham, S.E., for the Commissioners of H.M. Works and Public Buildings:—

| | | Credit. |
|---|---|---|
| B. & A. Gale | £4,009 0 | £12 12 0 |
| R. L. Stuart & Sons | 3,657 0 | 7 17 6 |
| J. E. Saunders | 3,585 0 | 100 0 0 |
| E. Smart & Sons | 3,401 0 | 6 18 6 |
| Patman & Fotheringham, Ltd. | 3,375 0 | — |
| Gathercole Bros. | 3,300 0 | — |
| W. Mills | 3,328 0 | 29 0 0 |
| W. V. Goad | 3,285 0 | 40 0 0 |
| H. Lovatt, Ltd. | 3,150 0 | — |
| Martin, Wells, & Co., Ltd. | 3,149 0 | — |
| R. A. Lowe | 3,134 0 | — |
| C. Ansell | 3,155 0 | 40 0 0 |
| H. L. Holloway | 3,139 0 | 24 0 0 |
| Turtle & Appleton | 3,120 0 | 40 0 0 |
| J. Smith & Sons, Ltd. | 3,075 0 | — |
| R. & E. Evans | 3,039 0 | 37 10 0 |
| J. & W. Drake | 3,131 10 | 131 15 0 |
| H. C. Payne | 3,053 0 | 95 0 0 |
| J. & C. Bowyer | 2,997 0 | 53 0 0 |
| E. E. Nightingale | 2,976 0 | 33 0 0 |
| H. J. Williams, Ltd. | 2,947 0 | 40 0 0 |
| J. Shelbourne & Co. | 2,897 0 | — |
| J. Garrett & Son | 2,868 0 | 36 0 0 |
| F. Webster & Son | 2,810 0 | — |
| Edwards & Medway | 2,790 0 | 25 0 0 |
| J. Barker & Co., Ltd. | 2,827 0 | 70 0 0 |
| Galbraith Bros. | 2,785 0 | 50 0 0 |
| W. H. Hyde | 2,766 0 | 33 0 0 |
| F. & G. Foster | 2,602 10 | 12 10 0 |

### LONDON BOARD OF EDUCATION TENDERS.

*Kennington, South Lambeth-road (Heating Apparatus).*

| | |
|---|---|
| W. G. Cannon & Sons | £998 0 |
| Purcell & Nobbs | 923 0 |
| J. Gray | 899 0 |
| J. Jeffreys & Co. | 889 0 |
| W. Richardson & Co. | 861 10 |
| Stevens & Sons | 858 0 |
| Brightside Foundry and Engineering Co., Ltd. | 857 0 |
| J. Yetton & Co. | 853 15 |
| Wenham & Waters, Ltd. | 841 0 |
| C. Kite & Co. | 765 0 |
| Lancashire Heating Co., Ltd. | 759 0 |
| G. & E. Bradley, 68 and 70, Effort-road, Highbury* | 721 0 |

[The architect's (Education) estimate comparable with these tenders is £765.]

*Norwood, Lyham-road Swimming Baths (Painting).*

| | | | |
|---|---|---|---|
| W. J. Coleman & Co. | £181 0 0 | J. J. Richards | £88 0 0 |
| J. W. Leonard | 175 10 0 | H. Bragg & Sons | 87 0 0 |
| E. Triggs | 130 0 0 | Maxwell Bros., Ltd., 310, Brixton-road* | 84 13 0 |
| W. Read | 117 0 0 | | |
| R. Harding & Son | 102 0 0 | | |

*Fire-guards for Special Schools, etc.*

| | |
|---|---|
| Carter & Aynsley, Ltd. | £114 0 0 |
| H. & C. Davis & Co., Ltd. | 112 2 0 |
| R. H. & J. Pearson, Ltd. | 103 0 0 |
| Pryke & Palmer | 102 12 0 |
| Nettlefold & Sons, Ltd. | 102 2 6 |
| W. Small & Son | 93 0 0 |
| Buck & Hickman, Ltd. | 87 17 6 |
| F. Bird & Co., 11, Great Castle-street, Regent-street* | 49 17 6 |

LONDON.—For decorative repairs, 77, Redcliffe-gardens, S.W. Messrs. J. W. Morley & Co., surveyors, 176, Earl's Court-road, S.W.:—

| | | | |
|---|---|---|---|
| W. Hawtrey & Son | £172 10 | G. Basing | £130 0 |
| H. Smith & Son | 142 0 | T. W. Heath & Son* | 124 10 |
| J. Rugg & Son | 136 0 | | |

LONDON.—For the erection of married couples' quarters, and alterations at the workhouse, Fulham Palace-road, S.E., for the Guardians of Fulham parish (revised tenders). Mr. A. Saxon Snell, architect:—

| | | | |
|---|---|---|---|
| Barker & Co. | £1,579 | Taylor & Co., Hammersmith* | £1,467 |
| F. G. Lawrence | 1,564 | | |
| Cowley & Drake | 1,507 | | |

MALPAS.—For erecting three blocks of cottages, for the Rural District Council. Messrs. T. M. Lockwood & Sons, architects, Foregate-street, Chester:—

T. G. Huxley, Malpas, Cheshire ..... £2,108

MEADVALE (Redhill).—For the erection of residence on Cronk's Hill-road, for Mr. Alfred Machin. Mr. A. W. Venner, architect, Redhill:—

| | | | |
|---|---|---|---|
| King & Son | £1,440 | J. Waycott | £977 |
| S. Jeal | 1,250 | Wickman & Son, Reigate* | 946 |
| A. B. Wiles | 1,150 | | |
| Elsey & Sons | 1,080 | | |

MOLESEY.—For erecting a residence at Hansler-grove. Mr. H. C. Fread, architect, Bank-chambers, Teddington. Quantities not supplied:—

| | | | |
|---|---|---|---|
| F. G. Lawrence | £890 10 | Cain & Son | £810 0 |
| Singleton & Sons | 890 0 | E. Potterton, Molesey* | 794 0 |
| Stokes & Son | 885 0 | | |
| Gaze & Son | 859 0 | | |

NEWBURY (Berks).—New scheme of outfall drainage and construction of bacteria filter. The London and Surburban Sanitary Survey Association, Connaught-mansions, Westminster:—

| | | | |
|---|---|---|---|
| W. N. T. Kelland | £847 | A. H. Houghton, Donnington* | £674 |
| T. C. Ranger | 823 | | |
| Victoria Sanitary Engineering Co. | 795 | | |

NOTTINGHAM.—For business premises, Nos. 43 and 45, Clumber-street, Nottingham. Messrs. A. R. Calvert & W. R. Gleave, architects, Nottingham:—

J. Wright, Nottingham* ..... £987

[Lowest of ten tenders.]

ORPINGTON (Kent).—For the erection of a private house. Mr. G. St. Pierre Harris, architect and surveyor, 8, Ironmonger-lane, E.C., and Orpington:—

| | | | |
|---|---|---|---|
| T. Knight | £1,119 | Podger & Son | £1,014 |
| J. Smith | 1,097 | W. Owen | 998 |
| Somerford & Son | 1,077 | Killick & Co.* | 995 |

ORPINGTON.—For the erection of a pair of semi-detached villas in High-street, Orpington, Kent. Mr. G. St. Pierre Harris, architect and surveyor, 8, Ironmonger-lane, E.C., and Orpington:—

W. Owen* ..... £660

ORPINGTON (Kent).—For the erection of two houses and shop premises, "Aynscomb Angle," Orpington. Mr. G. St. Pierre Harris, architect and surveyor, 8, Ironmonger-lane, E.C., and Orpington:—

A. Pannett* ..... £630

PARKSTONE.—For additions and alterations to Sandecotes School, Parkstone, for the Church Corporation, Ltd., London. Mr. Walter Andrew, architect, Parkstone. Quantities by the architect:—

| | | | |
|---|---|---|---|
| Miller & Sons | £2,919 10 0 | A. J. Colborne | £2,686 8 6 |
| Burt & Vick | 2,806 10 0 | Baker & Pearcy, Parkstone* | 2,576 11 6 |
| Brown & Son | 2,800 0 0 | | |
| Jenkins & Sons | 2,744 0 0 | | |
| A. & F. Wilson | 2,734 14 4 | | |

PARKSTONE.—For the erection of a bungalow at Sandbanks, Parkstone-on-Sea, Dorset, for Mr. Stewart King. Mr. Walter Andrew, architect, Parkstone:—

| | | | |
|---|---|---|---|
| Miller & Sons | £1,899 0 | Baker & Pearcy | £1,294 0 |
| Jenkins & Sons | 1,625 0 | Chinchen & Co., Parkstone* | 1,216 0 |
| Burt & Vick | 1,533 10 | | |
| A. & F. Wilson | 1,445 0 | | |

PEPPERMINT.—For rebuilding Peppermint (County) Bridge, for the Main Roads and Bridges Committee of the County Palatine of Lancaster. Mr W. Compton Hall, M.Inst.C.E., County Bridgemaster, Preston:—

H. E. Buckley ..... £517 12 5

PRESTON.—For widening Reedyford South (County) Bridge, on the main road from Nelson to Barrowford, for the Main Roads and Bridges Committee of the County Palatine of Lancaster. Mr. W. Compton Hall, M.Inst.C.E., County Bridgemaster, Preston:—

J. Strachan ..... £384 13 3

REDHILL.—For the erection of residence on Redstone Park, for Mr. J. R. A. Campbell. Mr. A. W. Venner, architect, Redhill:—

| | | | |
|---|---|---|---|
| Drowley & Co. | £1,150 | S. Jeal | £850 |
| C. Parsons | 965 | A. B. Wiles | 840 |
| T. Bashford | 933 | A. B. Apted | 789 |
| J. Waycott | 874 | E. Worssell, Redhill* | 787 |

REEDYFORD.—For widening Reedyford (Hundred) Bridge, on the main road from Nelson to Barrowford, for the Main Roads and Bridges Committee of the County Palatine of Lancaster. Mr. W. Compton Hall, M.Inst.C.E., County Bridgemaster, Preston:—

J. Strachan ..... £1,750 0 4

STOCKPORT.—For the completion of Chestergate Council schools, for the Education Committee. Messrs. Cheers & Smith, architects, Blackburn and London:—

J. Ridyard, Ashton-under-Lyne* ..... £10,651

SWINDON.—For the erection of the Ferndale-road Council schools, for the Corporation. Messrs. Nicholls & Stockwell, architects, 25, Regent-circus, Swindon. Quantities by Messrs. Drew & Sons, 28, Regent-circus, Swindon:—

| | |
|---|---|
| Jenkins & Sons | £14,687 0 0 |
| W. Jones | 14,400 0 0 |
| J. Long & Sons | 14,123 0 0 |
| A. J. Colborne | 12,996 5 11 |
| Annett & Son | 12,900 0 0 |
| R. J. Leighfield | 12,735 2 8 |
| T. Cuthbert | 12,700 0 0 |
| J. G. Norman | 12,157 9 0 |
| H. & C. Spackman, Hunt-street* | 12,029 16 4 |

SWINDON.—For erecting houses and shop in Princes-street, for Mr. W. J. Carpenter. Messrs. Drew & Sons, architects, Regent-circus, Swindon:—

| | | | |
|---|---|---|---|
| A. J. Colborne | £598 7 6 | J. G. Norman | £525 0 0 |
| H. & C. Spackman | 535 0 0 | R. J. Leighfield | 450 0 0 |
| | | Tydeman Bros.* | 444 10 0 |

[All of Swindon.]

SWINDON.—For making-up back road, rear of Deburgh-street (even), Swindon Estate, for Mr. James Morrison, J.P. Messrs. Drew & Sons, surveyors, Swindon:—

Tydeman Bros., Swindon* ..... £115 0 0

[Three tenders received.]

THIRSK.—For Lambert Memorial Hospital extension scheme. Mr. T. Stoes, architect, Westgate, Thirsk:—

| | | |
|---|---|---|
| *Builder:* W. Jackson, Thirsk | £366 | 0 0 |
| *Joiner:* M. Westwick, Thirsk | 135 | 0 0 |
| *Plumber:* T. Ames, Thirsk | 55 | 9 6 |
| *Painter:* J. Butterford, Thirsk | 16 | 0 0 |
| *Heating:* T. Ames, Thirsk | 32 | 7 6 |
| *Electric Bells:* E. Tumber, Thirsk | 3 | 8 0 |
| *Electric Light:* E. Tumber, Thirsk | 10 | 4 0 |
| *Slater:* Baynes & Beck, Ripon | 39 | 17 0 |

TILBURY.—For pulling down existing mortuary, and erecting a new building containing mortuary, post-mortem rooms, for Orsett Rural District Council. Mr. S. A. Hill-Willis, Surveyor, Council Offices, 2, Orsett-road, Grays. Quantities by Surveyor:—

| | | | |
|---|---|---|---|
| H. H. Carter | £400 1 2 | F. & A. Willmot | £299 0 0 |
| F. E. Smith | 380 18 0 | Baby & Chivers | 298 2 6 |
| J. W. Cooke | 375 16 2 | H. Philbury | 295 7 10 |
| W. G. Thompson | 352 13 0 | Elvy & Son | 294 0 0 |
| G. B. Ross | 334 17 4 | W. White | 281 0 0 |
| Brand & Sons | 331 7 9 | Pavitt & Sons | 252 11 8 |
| W. T. Green | 315 11 0 | R. J. Mead, Little Thurrock (Essex)* | 232 1 0 |
| W. H. Hyde | 313 10 0 | | |
| Mundy & Co. | 309 9 5 | | |

WALPOLE ST. ANDREW (Norfolk).—For alterations and additions to house and barn, for Mr. William Wing. Messrs. Walker & Walker, architects, Wisbech and Terrington St. Clement:—

| | | | |
|---|---|---|---|
| J. T. Jewson | £625 | P. Bone | £500 |
| T. Pryor | 612 | G. Holman | 499 |
| G. J. West | 600 | Emmerson & Son | 485 |
| J. S. Johnson | 550 | F. S. Flood* | 485 |
| J. W. Wilkinson | 532 | | |

WATFORD.—For alterations to Yew Croft, Bushey Heath, Watford. Mr. Fred Taylor, architect, Aylesbury:—

D. Cook & Son, Leighton Buzzard ..... £568 0 0


**W. H. Lascelles & Co.**

LIMITED,

121, BUNHILL ROW, LONDON, E.C.

Telephone No. 1365 London Wall.

HIGH-CLASS JOINERY, LASCELLES' CONCRETE.

Architects' Designs are carried out with the greatest care.

CONSERVATORIES, GREENHOUSES, WOODEN BUILDINGS,

Bank, Office, and Shop Fittings.

CHURCH BENCHES & PULPITS.

ESTIMATES GIVEN ON APPLICATION.

**The BATH STONE FIRMS, Ltd., BATH.**

For all the Proved Kinds of

**BATH STONE.**

FLUATE, for Hardening, Waterproofing, and Preserving Building Materials

**HAM HILL STONE. DOULTING STONE.**

The Ham Hill and Doulting Stone Co., Limited (Incorporating the Ham Hill Stone Co. and C. Trask and Son, The Doulting Stone Co.).

Chief Office:—Norton, Stoke-under-Ham, Somerset.

London Agent:—Mr. E. A. Williams, 16, Craven-street, Strand.

**GREEK MARBLE.**

White and Blue Pentelikon at Low Prices for BUILDING PURPOSES.

*Beautiful Colours for Interior Decoration.*

Full Particulars and Samples:—

MARMOR, LIMITED, 18, Finsbury-square, E.C.

See Advt. p. xiv.

**Asphalte.**—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to the Forth Bridge Co.

**SPRAGUE & CO.'S, Ltd.,**

"INK-PHOTO" PROCESS,

4 & 5, East Harding-street,

Fetter-lane, E.C.

QUANTITIES, etc., LITHOGRAPHED accurately and with despatch. [Telephone No. 634 Westminster.

**METCHIM & SON** {6, PRINCES STREET, S.W. and 23, CLEMENT'S LANE, E.C.

"QUANTITY SURVEYORS' DIARY & TABLES," For 1906, price 6d., post 7d. In leather, 1/-, post 1/1.

**JOINERY**

Of every description and in any kind of Wood.

**CHAS. E. ORFEUR, LTD.,**

ESTIMATES ON APPLICATION. COLNE BANK WORKS, COLCHESTER.

Telephone: 0196. Telegrams: "Orfeur, Colchester."

LONDON OFFICE: 161, COMMERCIAL STREET, E.

**PILKINGTON & CO**

(ESTABLISHED 1838.)

MONUMENT CHAMBERS, KING WILLIAM STREET, LONDON, E.C.

Telephone No., 6319 Avenue.

Registered Trade Mark.

**Polonceau Asphalte.**

PATENT ASPHALTE and FELT ROOFING.

ACID-RESISTING ASPHALTE.

WHITE SILICA PAVING

PYRIMONT SEYSSEL ASPHALTE.

**Patent "OPALITE" Tiling**

TRADE MARK.

With Shelmerdine's Patent Granulated Backing.

SANITARY. DURABLE. EFFECTIVE. Is non-porous, and absolutely impervious to bacteria, fungi, or vermin.

The only Reliable Material for Lining Walls of SUBWAYS, LAVATORIES, AREAS, KITCHENS, BATHROOMS, &c.

Invaluable for HOSPITAL WORK, Operating Rooms, &c.

WILL NOT CRACK OR CRAZE.

Over 250,000 Square Yards Fixed in LONDON Alone.

"OPALITE."

SUPPLIED AND FIXED BY

**WILLIAM GRIFFITHS**

(London Concessionaire of Patent Rights of the National Opalite Glazed Brick and Tile Syndicate, Limited).

126, HAMILTON HOUSE, BISHOPSGATE ST. WITHOUT, E.C.

Telegraphic Address: "OPALITE, LONDON." Telephone Nos. 2268 and 2269, LONDON WALL.

ORDINARY GLAZED TILING Executed with Care and Despatch by Competent Workmen.